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EDUCATION THROUGH MANUAL ACTIVITIES

BY

ANNA M. WIECKING

TEACHER OF ELEMENTARY HANDWORK, STATE TEACHERS
COLLEGE, MANKATO, MINNESOTA



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PREFACE

Manual materials are those materials that are useful in the expression of ideas by means of the hands. The term is broadly used to include any material that can be converted from one form or arrangement into another at the direction of the mind. Thus considered, wood, clay, paper, cloth, yarn, twigs, and blocks are some of the many manual materials.

With all these as media many kinds of educative activities are possible. Just as language serves a variety of motives in human expression, just so do the manual arts serve as mediums of expression, legitimately leading in many directions, each valuable in its own right. A child may pat a piece of clay to satisfy the manipulative impulse, or he may roll his clay into a snake and thus give form to a passing idea. A child may make a doll to satisfy a desire to nurture. He may weave a rug for a playhouse and be led to realize some truths about shelter — the industrial emphasis; he may work out designs for wall paper and thus be led to follow the fine-arts impulse. He may make a game that furthers number ideas through play, or make a toy that enables him to discover certain mechanical principles. He may make a headdress or a little theater to aid some dramatic plan. The field of manual activities is indeed a rich one, satisfying many needs of childhood and, under guidance, developing in children appreciations and abilities of great value.

This book is designed for teachers of kindergarten and primary grades. It should also have interest for parents

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of the children of those grades, from the point of view of its bearing upon home play and the employment of leisure.

Progressive educators of little children no longer ignore as trivial the manual side of education, but there is wide disagreement in its use, owing to its later entrance as an integral part of the curriculum and also because it has not become standardized as yet. It is the aim of this book to present a liberal but tenable point of view consistent with the nature and needs of the child, with the demands of the various subjects to be mastered, and with the limitations set by school budgets and the physical limitations of space and time.

Part I takes up each kind of material intensively. Suggestions are made for buying and using. A suggestive list of possible problems with each material is given, with help in their construction. Part II deals with manual activities as they relate themselves to the various kinds of subject matter, to school subjects, and to the many appreciations inherent in them. Part III deals with the general point of view regarding manual activities, their educational value, the methods of teaching involved, and the problems of management and cost in the average school situation.

I take this opportunity of acknowledging my indebtedness to Miss Josie Manderfeld, who has greatly aided me in the development of this book by her criticisms, suggestions, and help with some of the illustrative material. I also wish to thank sincerely several of my fellow instructors in State Teachers College, Mankato, Minnesota, for their interest, criticism, and suggestions. Lastly, I wish to express my appreciation of the many students in State Teachers College who, by expressing their individuality in my classes, have contributed many ideas incorporated in this volume.

A. M. W.

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EDUCATION THROUGH MANUAL ACTIVITIES

PART I. MATERIALS, TOOLS, TECHNIQUES, PURPOSES

INTRODUCTION TO PART I

The first part of this book is devoted to a description of the materials and their uses which have been found to be useful in kindergarten and primary grades. Since the average teacher has a limited budget, it was thought advisable to review materials and their possibilities in order to help her to purchase more intelligently. This section of the book should also serve as a ready reference for help concerning ways and means of using materials, tools, and accessories. It is, of course, obvious that in no progressive school does the teacher work first in only one material and then in another. Projects demand a variety of materials in varying combinations.

In reading the following pages it may seem to some that, since definite ways of making things are suggested, these same directions are to be given out to children in this arbitrary fashion. Nothing is further from the truth. These definite suggestions are supposed to give the teachers some ideas as to how things *may* be done. The methods for guiding children are discussed in another part of the book. While it was felt that teachers might be glad to know of possible objectives toward which they might lead children, yet the teacher's own originality must never be minimized. Mental growth in children is always more important than finished products, and it should be the business of the teacher to see that the child does use his powers in solving problems of real worth to him.

CHAPTER I

WEAVING

In children the strongest motive for the use of weaving is the need for dolls' clothing and the furnishing of play-houses and doll houses. Sometimes, too, an acceptable gift may be woven for mother or for a friend.

There are several considerations that affect the choice of weaving problems for little children. The health values must be kept in mind. Only coarse materials should be used, both because the handling of fine material requires finer muscular control and because weaving with fine material takes more time. A period of fifteen minutes for the younger primary children, and not more than half an hour for the older ones, is long enough. Lighting and posture must be good, and nerve strain must be minimized by seeing to it that no child is unduly fatigued or made nervous by the demand of the teacher for a highly finished piece of work.

Weaving is only one kind of handwork, and should not be used overmuch. There are other activities that should have preference both for the sake of health and for reasons of stronger motive and greater possibility for self-expression.

Children should weave with real textile materials, such as are used in the world of industry to satisfy human needs of shelter and clothing. Paper mats are false to industrial truth and were invented in the day when children were kept "busy" at the expense of their health and education.

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VALUES IN WEAVING

In general it is better for a child to make his own loom and set up his own weaving in order that he may understand the entire process and its relation to human needs. This does not forbid the occasional use of a commercial loom when children have already made looms. The planning of the article as to size, material, color, and design is quite as important as the actual weaving, if not more so. A loom must be made with accuracy, and there is much opportunity to stress measurement. The weaving itself must be done with care and finish, but there is, after all, a mechanical repetition about weaving that is not of much educational value. Often the actual weaving may be done during unsupervised periods, when once a child has learned to do it.

WEAVING IN THE LOWER GRADES

It seems wiser not to consider weaving as a typical kindergarten activity, although capable children in that grade may sometimes weave a stoveholder of coarse rags or cotton roving. Sometimes the children coöperate in the weaving of a rug for the doll house, so that each child does a small share.

In the first grade the children may make the looms and set up the weaving for four-sided articles such as stoveholders, coarse rugs, and hammocks. While first-grade children are often able to do the simple yarn weaving of a muff or scarf for the doll, still it seems better, on the whole, to reserve the finer work for later grades.

Second-grade and third-grade children may make any of the four-sided articles with more elaborate designs and ornamentation. They may add also the weaving of yarn tams, muffs, sweaters, and scarfs, and such articles as

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roving or jute bags are also interesting to make. Yarn of the weight known as fourfold is the finest yarn that should be used by primary children, and coarser yarn than that is to be preferred if obtainable. No primary child should use such materials as common cord or macramé cord for weaving, as it is too fine and does not weave a good fabric.

GENERAL DIRECTIONS FOR WEAVING

The term *warp* means the foundation of the weaving, and warp threads run lengthwise in the stringing of a loom. Although there is a cord, similar to common string, that is called carpet warp, the term *warp* may mean yarn, roving, or whatever is used to string the loom. The term *woof* means the material that is used to weave back and forth, over and under the warp. Looms may be strung with carpet warp or rags for rag rugs, with carpet warp for roving articles, with macramé cord for roving hammocks, and with either carpet warp or yarn for the yarn weaving. When we use rags or roving for woof, the warp threads should be half an inch apart. If finer materials are used for woof, the warp threads may be three eighths of an inch apart.

There are many kinds of weaving needles on the market. Some prefer the fingers to needles in weaving with rags or roving. Any wide-eyed blunt needle will do for the yarn weaving. When a heddle is used, the woof may be wound on a piece of cardboard to serve as a *shuttle*.

In weaving, the woof threads should be close together but never bunched or tight in appearance. As the woof is made it should be pushed back with the fingers, which serve as a *batten*. The batten in larger looms is a specific device for pushing back the woof. The beauty of woven fabric depends on the even way in which the woof is

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handled. The tension of the thread should always be the same. When beginning a round piece, care must be used to avoid pulling in at the center; otherwise the article will be peaked there.

When a new woof thread needs to be added, a knot may be tied, and the ends later poked underneath. As soon as the children are able they may learn to lap the woof thread for an inch.

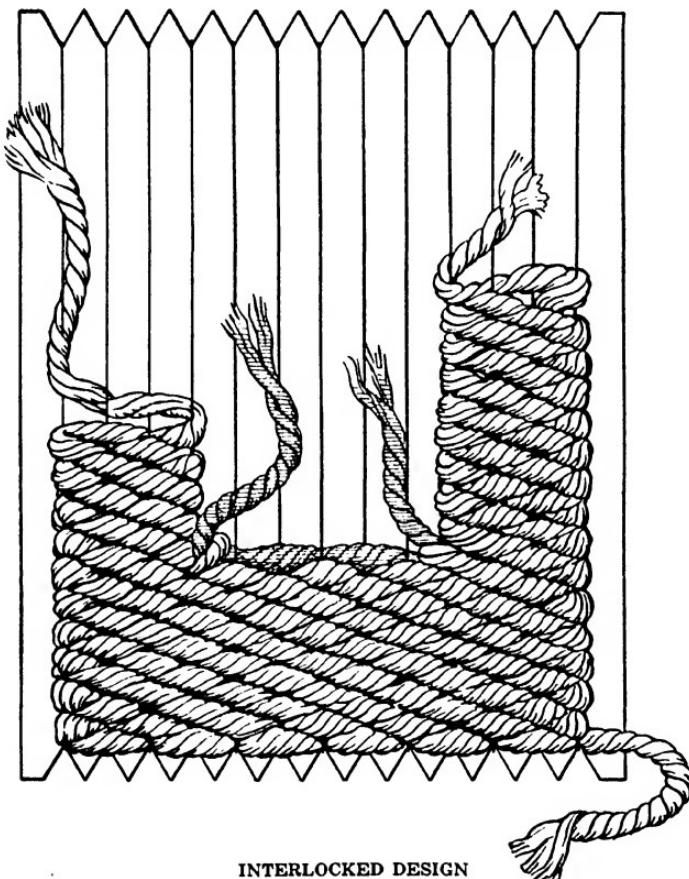
The *heddle* is a contrivance for raising the alternate warp threads to allow passing the woof material through quickly instead of going over and under each separate thread. This forms the *shed*, a tent-shaped space through which the woof is passed. Second-grade and third-grade children can make use of this principle. A true heddle can be used only in a hollow frame, not on a flat pasteboard loom, but for weaving on a cardboard loom the principle of the heddle may be used to some extent by slipping a stick or pencil through several or all alternate threads and lifting them up. A little more advanced is the method of a stick and cord. Thread the cord into a needle and loop it around the first warp thread, then over the stick, around the third warp thread, over the stick, and so on, always connecting alternate threads with the stick. When this is lifted, a shed is formed through which the thread may be passed. Special heddles will be described with their looms.

DESIGN IN WEAVING

Designs may be worked out by inserting different colors into the woof and varying the number of over and under threads. A more difficult way of weaving in design is by the method of interlocking the threads. First the pattern is worked out on squared paper, so that the lengthwise lines of the squared paper correspond to the warp threads

WEAVING

on the loom. Draw this design on the loom if that is easier. Now weave in the design in the center, and then begin to weave in the background around the design.



INTERLOCKED DESIGN

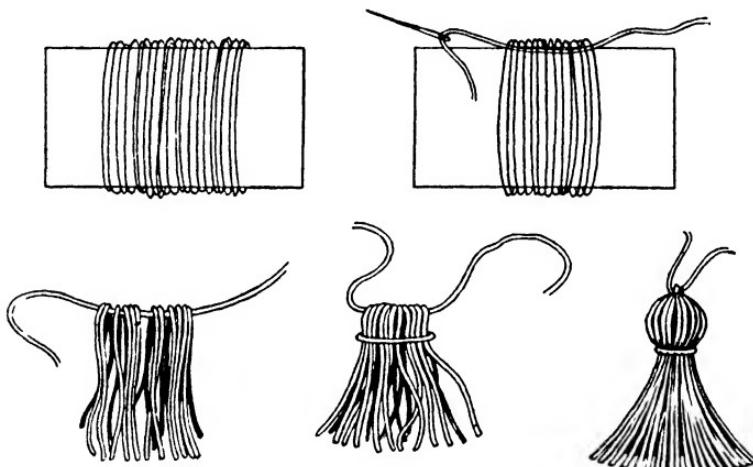
Whenever a background thread meets the thread in the pattern or design, the needle is caught or interlocked with that thread. The result is a firmly woven fabric with no break in the weaving.

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THE FINISHING AND DECORATING OF WEAVING

Woven articles may be decorated after they are completed by adding crocheted flowers, or by coarse embroidery with yarn. Yarn or roving may also be couched down on the woven fabric after the article is completed.

When the edges of weaving seem unfinished, they may be buttonholed with yarn, or the edge may be crocheted.



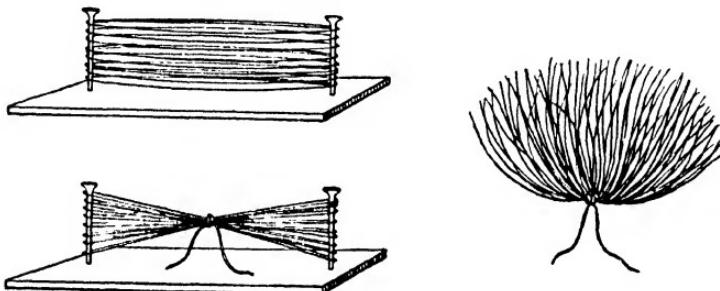
STEPS IN THE MAKING OF A TASSEL

How to make tassels. Cut a small piece of cardboard as wide as the length of the desired tassel. Wrap around the width of this cardboard the amount of yarn to be put into the tassel. Now slip a needle threaded with a piece of yarn through the loops of wrapped yarn at one side of the cardboard. Then slip the yarn all off the cardboard, and pull up the draw string and tie. A second piece of yarn is used to bind the tassel near the top. Cut the loops of the tassel and trim. Attached to the ends of a crocheted cord, these tassels add a pretty effect to a sweater or a muff.

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How to make a pompon. Find a small piece of wood and drive into it two long nails as far apart as the diameter of the desired pompon. Wrap around these nails sufficient yarn to make the thickness desired. Now with a piece of yarn draw up the whole wrapped mass around the center and tie it tightly. Now cut the yarn where it is looped around the two nails. Hold the pompon over the spout of a teakettle, and trim into shape with scissors.

How to make cords. Cords for trimming yarn articles may be crocheted. They may also be made by twisting. Cut

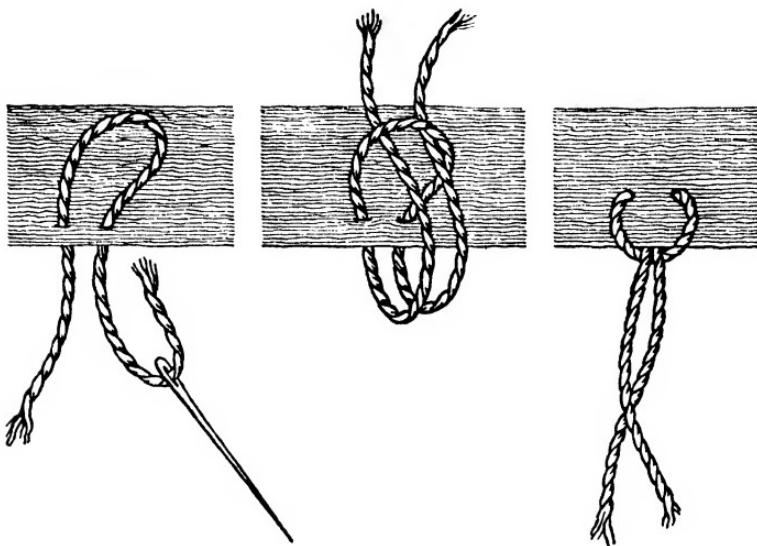


STEPS IN THE MAKING OF A POMPON

a piece of yarn five times the desired finished length of the cord. Tie the two ends together and twist tightly while the other doubled end is held to something stationary by means of a thumb tack. Or two persons may twist together, each holding one doubled end. When the cord is tightly twisted along its entire length, but not knotted or tangled in appearance, put the two opposite ends of the twisted length together, hold it up so that it will hang free, and the twists will "jump" into a finished cord.

How to tie a fringe. Cut the cord or yarn in pieces a little more than twice the desired length of the fringe. Double each piece and put the doubled end through a hole near the edge of the rug. As you put this doubled end through,

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METHOD OF TYING FRINGE

draw the ends through the loop thus formed and pull tight, making a knot. Knot the fringe as close together as desired, and whenever possible include a warp thread in the process.

SOME WEAVING PROBLEMS FOR LITTLE CHILDREN

Rug materials. Rugs for playhouses or doll houses may be made out of several materials. Rags are excellent and, with a little expenditure for dye, very pretty effects may be obtained. The children enjoy using dyes, and any good commercial kind may be used successfully by following directions. Rags are sewed together as follows: Tear the rags, or cut them, about an inch wide. Lap the ends of two pieces an inch, turn in both edges toward the center, and sew over and over. This turns the raw edges in. Another method of joining rags is done without sewing,

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and the method is successful in larger pieces where the knots are not so prominent. Cut a small lengthwise slit near the end of one piece of cut rag, then cut another slit near one end of another piece. Hold these two slit ends one in each hand. Put the one in the right hand through the slit in the left-hand strip. Bring the hanging end of the strip in the right hand upward and put it through the slit end of the same strip as it emerges from the slit in the left-hand strip. Pull tight to make a knot.

Another excellent material for rugs is cotton roving, which is soft, thick, and cottony in texture and comes in a variety of pretty shades. Rug yarn, which feels like harsh wool, is very suitable for rugs, but many schools find its expense prohibitive. Jute is a hemplike material that feels like rope. It is finer than the other rug materials and so serves only for smaller articles. School-supply companies will gladly send samples of these materials on request.

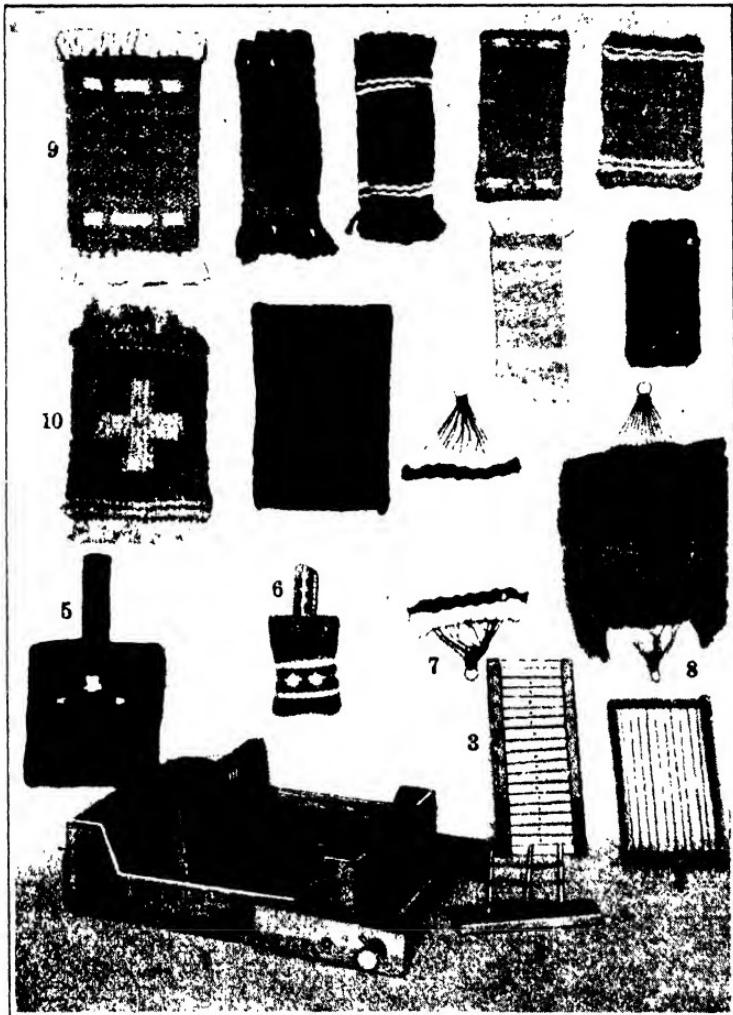
Rug looms. These may be purchased, but it seems desirable to allow children to make their own. *A simple wooden loom* is made as follows: With wood about an inch wide and half an inch thick construct a four-sided frame the size of the rug desired. Measure off half-inch spaces along the two short sides of the frame and put in a row of small nails on both these ends. To string the loom, tie a piece of carpet warp to an end nail on one side of the loom. Carry it across the length of the loom around the first two nails there. Bring it back around the second and third nails on the starting side. Proceed thus until the loom is completely strung, always going around two nails at a time. To make sure that the rug is of the same width throughout, nail along the long sides of the loom two thin dowels, or attach two straight wires, knitting needles, or discarded hatpins. The weaving must be carried over these

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guides whenever the sides are reached in going back and forth. Instead of constructing a frame for the loom a wooden box with top and bottom removed may be used.

A *cardboard loom* may be used for rugs. Cut a piece of chipboard or other cardboard the size of the desired article plus a half-inch margin all around. For coarse weaving point off half-inch spaces on the short ends of the loom. Punch these dots with a punch or a needle. Thread the loom exactly as the wooden loom was threaded, substituting the punched holes for the nails. To keep the rug of the same width throughout, baste down the outside warp threads at intervals or find hatpins or wires to use as side guides.

A more *advanced loom with a roller* may be made of a shallow wooden box and an old piece of broom handle or a dowel an inch thick. This roller enables the child to weave a fabric of any desired length, and a heddle and shuttle may be used to increase the speed of the weaving. To make this roller loom : (1) Cut out the greater part of the long sides of the shallow wooden box. This makes room for the weaving. (2) Cut the piece of broom handle somewhat longer than the width of the box and in it, at intervals of a quarter of an inch, cut kerfs, or grooves, half through its thickness. (3) Nail a piece of board to each side near the bottom, or floor, on the outside and near one end of the box. These boards should project beyond the end of the box, and when holes have been bored in them several inches beyond the box, the broom handle is slipped through. Thus the broom handle is in place just outside the box, parallel to one short end. (4) To keep the roller from slipping too far, put two long nails through tiny holes bored through it and the boards which hold it. When these nails are removed, the fabric already woven may be rolled up, allowing more to be woven. (5) Small nails are driven



SOME LOOMS, AND ARTICLES WOVEN WITH COARSE MATERIALS
1, roller loom ; 2, frame for knotting a heddle ; 3, the slat heddle ; 4, a simple wooden rug loom ; 5, 6, bags ; 7, 8, hammocks ; 9, 10, rugs with interlocked design. Remaining illustrations show rugs with simple border designs

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one fourth of an inch apart in the short end of the box on the side opposite the roller. These keep the warp threads parallel. (6) The heddle is a rectangular frame made of small strips of wood. Narrow perforated slats of wood or cardboard are nailed across it. Another way to make a heddle is to knot stout cord over the sides of it. Each cord has an open knot tied in the center, through which alternate warp threads pass. A coat of shellac makes the knotted heddle more stable.

To string the roller loom, cut warp threads somewhat longer than twice the length of the desired article. Loop the center of a warp thread over two of the grooves in the roller, then stretch one end straight across the loom inside the heddle frame. Stretch the other end across, stringing it through the open hole or loop of the heddle. Continue until all the desired space has been filled with warp threads. The alternate warp threads will hold the heddle suspended so that it may be pushed back and forth. Now tighten the warp threads, and make sure that they are parallel by placing each thread in order between two of the tiny nails at the other end of the box. Tie the ends of thread hanging down beyond the nails into bunches of six and fasten them by a string to nails put into the end of the box. The threads of the loom must be taut.

To weave on the roller loom, begin at the roller end. While raising and lowering the heddle, pass the shuttle through the alternating sheds with one movement of the hand. The sawed-out sides of the box afford room for the hands, and the yarns and shuttle may be kept in the bottom. The shuttle may be a piece of cardboard with a quantity of yarn wound upon it. When a fabric as long as the loom has been woven, untie the ends of the warp threads, remove the two nails holding the roller

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in place, and roll up the material. Rugs, runners, and scarfs may be woven on this loom.¹

For the *loom for a round rug*, cut out a circle of cardboard the desired size plus a half-inch margin. Draw the margin with compasses and mark the center of the circle. On the margin line point off half-inch spaces for rags or roving, and three-eighths-inch spaces for jute. When within an inch of pointing off the last space, count the dots. Since there must be an odd number of dots in all, divide the remaining space to make this possible. Then notch the margin to the dots, taking care that the point of each notch is exactly on the dot.

To string a round rug loom, use carpet warp. Lay the warp across the loom, dividing it in half. Allow about a foot of the end of the warp to hang over the edge of the loom. Holding down this end with the left hand, hook the warp lying across the loom around the notch on the opposite side, then bring it back across the center of the top of the loom and hook it around the notch next to the starting-point. Continue around, always crossing the center whenever you cross the loom. On the top there should be only long spokes going across the loom; on the back there should be nothing but the stitches that hook around the notches. Every notch must be filled. When you have gone as far as possible, some adjustment may be necessary to finish the stringing. Sometimes the thread left hanging at the beginning will help to complete the stringing; sometimes another piece of warp must be added to a stitch in order that every notch may be filled. Fasten ends of warp to stitches on the back, never to spokes on the top. When there is a complete odd number of spokes,

¹ A blue print of the working plan for a roller loom may be obtained for ten cents from the Industrial Arts Coöperative Service at Teachers College, Columbia University, New York City.

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carry the remaining warp to the center and with a needle make a stitch through all the spokes crossed there but not through the cardboard. This is merely to hold the whole together. Attach the woof material to the short end left in the needle and begin the weaving.

When weaving a round rug begin at the center and fill the whole loom, being careful not to pull in too tightly at the beginning. When using thick material begin by weaving several times around with a thin piece cut or split off from the length.

Stoveholder. Make a loom as for a four-sided rug. String the loom with warp for rag weaving; or string it with either warp or roving for weaving with roving. When finished the holder should have a ring or a loop for hanging.

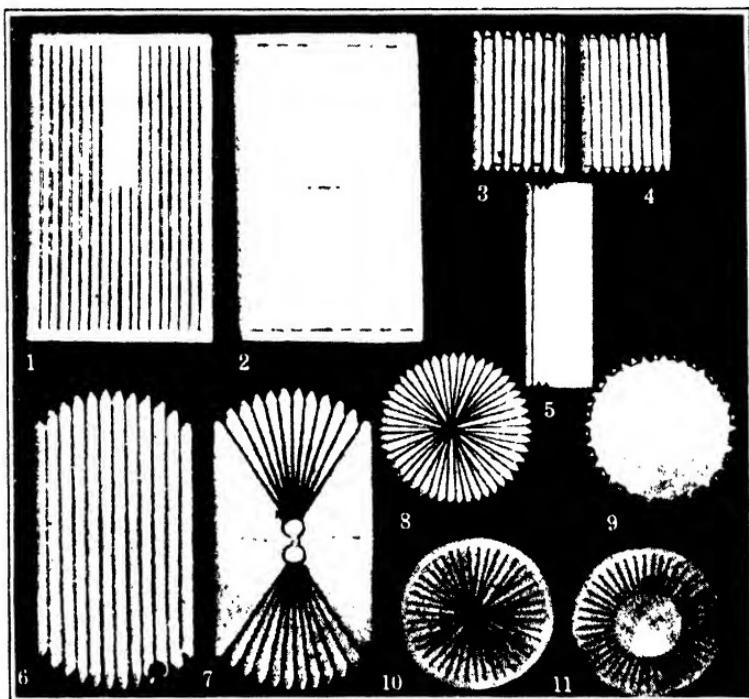
Hammock. Cut a piece of cardboard six by twelve inches in size. With a string and pencil describe shallow arcs along the short ends. The radius of the arcs should be almost as long as the loom. Draw a half-inch margin inside these arcs. Point off half-inch spaces along these margin lines. Notch to the dots. Then baste two brass rings to the back of the loom so that they touch each other at the center and lie in a line going lengthwise.

To string the hammock loom, tie macramé cord to one ring. Carry it into the first notch in the nearer end, and across the front of the loom to the notch corresponding on the other end. Pass the cord into the second brass ring and through it to the second notch on the nearer end of the loom. Cross the front again, and proceed until every notch is filled.

Cotton roving is best for hammocks, although jute is suitable for small hammocks. The material may be cut in strips, allowing the ends to hang over for the fringe; or the material may be woven back and forth continuously.

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The weaving must be started straight across the loom, not curved with the ends. When the hammock is woven, weave back and forth for an inch near the rings with the



CARDBOARD LOOMS FOR YARN WEAVING

1, 2, front and back of sweater loom; 3, 4, front and back of muff loom; 5, front view of a scarf loom with one warp thread in place; 6, 7, front and back of a hammock loom; 8, 9, front and back of a round rug loom; 10, 11, front and back of a fitted-tam loom

macramé cord to keep the strings from twisting. Then cut the bastings that hold the rings. In the fringed hammock baste the whole to a piece of paper and run a machine stitching beside the fringe to hold it in place, or blindstitch by hand. If after the hammock is hung, the

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weaving at the ends tends to spread, knot a piece of cord from one warp thread to the next on both ends of the fabric, to keep it close, or blindstitch back and forth, to hold the woof together.

Bags. A simple bag may be made by weaving a strip and then folding it and sewing it along two sides. A round bag may be made by weaving two mats or round rugs as described above, and then sewing these together, leaving an opening at the top, and supplying a handle.

Another way to weave a four-sided bag is to make a special loom and weave round and round continuously, making only one seam necessary. Cut a piece of cardboard the size of the desired bag. On the end where you wish the bag to open and on the opposite end, draw half-inch margins. For roving, point off half-inch spaces on these two margins, and notch the margins to the dots.

String this special loom with carpet warp or with roving. Leave an end hanging, and lay the warp across the loom from the first notch on one end to the notch directly opposite. Hook the warp around the notch and carry it back across the same side of the loom as before. Hook around each notch until one side of the loom is entirely filled. Then turn the loom over and fill the other side as you filled the first. This time when you have finished, there will be both long warp threads and stitches around the notches on both sides of the loom. At this point you will have, counting both sides, an even number of warp threads. In order to weave around the loom you must in some way add one more warp thread, thus making an odd number. Cut a little way into the loom between the last notch and the edge. Pass the warp thread through this cut and across the front of the loom to a corresponding cut there. Do not make the mistake of passing this extra warp thread down the back of the loom, thus again making the

WEAVING

total number of threads even. Ends of warp may be fastened to stitches and cut off. Surplus cardboard should be trimmed from the long edges.

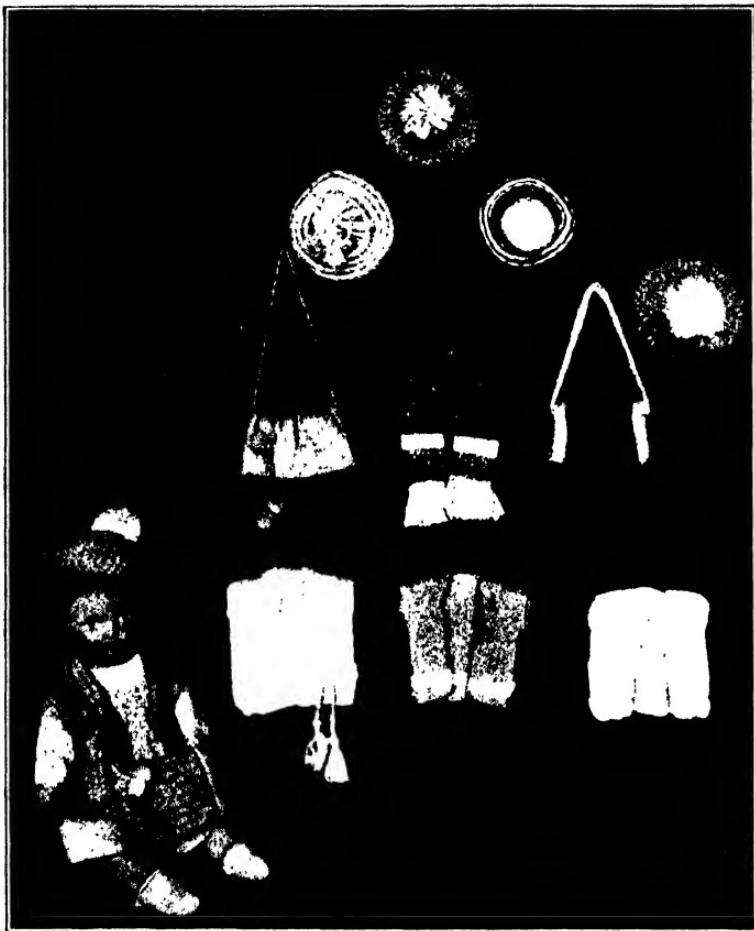
Weave round and round the loom until it is filled. Slip the fabric from the loom, sew the tube up at one end, and supply handle and decoration.

Doll's sleeveless sweater. Cut a piece of cardboard seven by twelve inches. Draw a half-inch margin all around the four sides. On the short ends point off three-eighths-inch spaces. With a ruler draw lines connecting these dots lengthwise. Draw a line to divide the length of the loom in two. Punch all the dots made on one of the short ends of the loom. Punch all the dots on the other end excepting the center three. Punch the three dots in the center of the loom where the three lengthwise center lines cut the line dividing the loom in half.

String the loom with yarn threaded into a needle. Let the side of the loom on which lines were drawn be considered the front. Bring the needle up from the back through the first hole at a corner of the loom on the side where the three center holes were omitted. Leave an end of yarn hanging down. Now pass the yarn across the front of the loom and into the corner hole on the opposite end of the loom. Bring the yarn up into the adjoining hole, then across the loom again into the next hole there. Never skip a hole, and keep all the warp threads on the front of the loom, all the stitches on the back. You should have the same number of long warp threads on either side of the center and three short ones in the center. You will need to put a double warp thread into the center, a necessity which will be apparent when you get to that point.

Baste the outside warp threads down to the loom. Weave the wide end first and then continue up one narrow side. Break the thread and fasten to the other side

EDUCATION THROUGH MANUAL ACTIVITIES

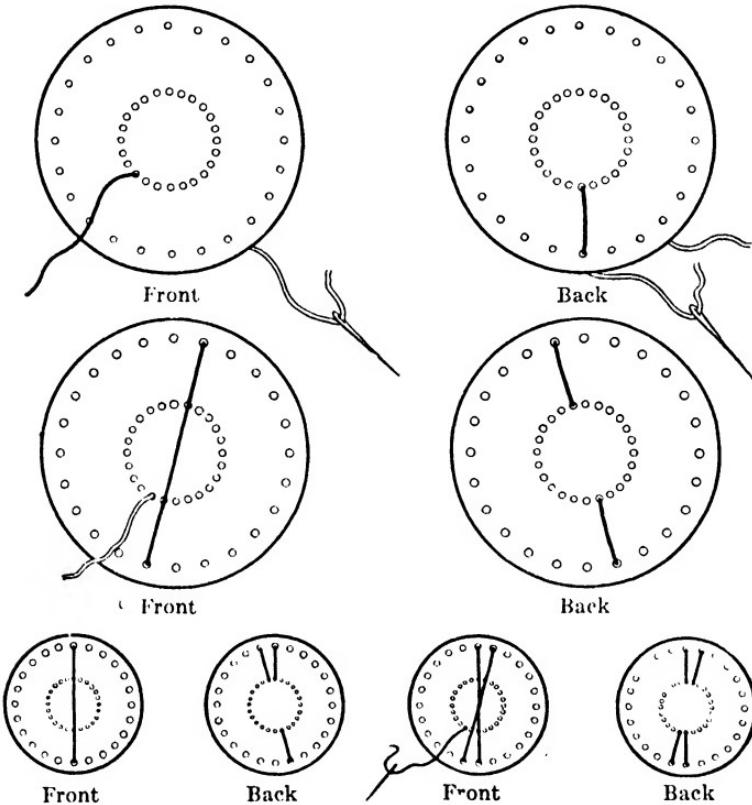


WOVEN WEARING APPAREL FOR DOLLS

and complete the weaving. Break the loom to remove the work. Lap the narrow sides over the wide, and sew the underarm seams to form a sleeveless sweater. Collar and vest of cloth or lace, crocheted or twisted cords for tying at the neck, and buttonholed or crocheted edges make the

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sweater more attractive. If a sweater is desired that slips over the head, the loom may be changed so that there is only a square or rectangular opening in the center. The whole loom except this opening is filled with weaving.

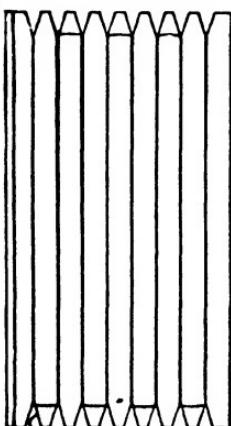


FRONT AND BACK VIEWS OF STEPS IN STRINGING THE
FITTED-TAM LOOM

Fitted tam-o'-shanter. Measure the head size of a particular doll and make the tam to correspond in proportion. For a small doll cut a six-inch circle. Draw a margin circle three eighths of an inch from the edge, and another circle

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halfway between the margin and the center. This is the head size. Mark off three-eighths-inch spaces on the margin circle and see that you have an odd number of dots. By drawing with a ruler connect the center of the circle with each of these dots. Punch all the dots on the margin circle, and punch all the points where the inner circle intersects the drawn lines.



STRINGING THE LOOM
FOR THE MUFF OR BAG

Inserting the extra warp
thread

String the loom with yarn as follows: Thread the yarn, perhaps a yard in length, into a needle. Leave a hanging end about eight inches long, and lay the warp across the loom, dividing it as nearly in half as possible. Put the needle down through the outside hole that marks the half of the outside circle, and bring it back up through the center circle in a direct line with the center of the loom. You have made a long spoke on the top of the loom and a short spoke on the back. Be sure that both of these first spokes are in a direct line with

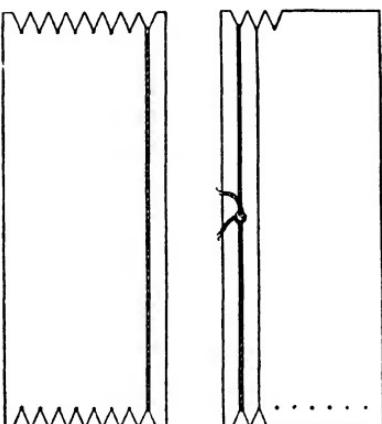
radii of the circle. In order to get into position to make another spoke you will now need to put the needle down through an adjoining hole, thus making a short stitch on the top side. You are now in position to make another short spoke next to the first one on the back of the loom by bringing the needle up through the adjoining hole on the outside circle. Now you are ready to cross the front of the loom again, dividing it in half through the center by putting the needle through an outside hole next to the place where you started your stringing. Continue in this way, always crossing the center

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when making a long spoke. Never skip a hole. Fill the top of the loom with long spokes, and the back with short ones. The short stitches by which you are able to get from one position into another should be on the top of the loom only, and should never bind down a long spoke. When you have gone as far as possible in filling both sides of the loom, make whatever adjustment is necessary.¹ All holes must be filled, and there must be an odd number each of long and short spokes.

Any yarn of at least the weight known as fourfold is suitable for weaving the tam. Begin at the center and weave the top side first. Then put your needle through to the other side and carry to inside circle, weaving to the outer edge. Break the loom to remove the tam. Put on a pompon.

Muff. Cut the cardboard the size of the muff. A piece three and a half by five inches makes a good size. Draw a three-eighths-inch margin on each short end, and point off three-eighths-inch spaces. String the loom as described under "Bags," above,² making an extra warp thread as mentioned there, to keep the total an odd number. When the muff has been woven, remove it from the loom. Finish the edges with buttonhole stitch or crochet. Add tassels, cord, or other ornamentation.



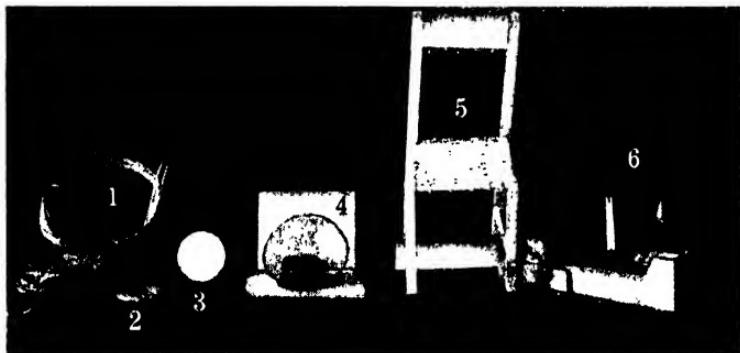
THE STRINGING OF THE SCARF LOOM

¹ See directions for finishing the stringing of the round rug loom, p. 15.

² See page 18.

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Scarf. Make a cardboard loom the width of the scarf, and of convenient length. Three inches wide and twelve inches long is a good size for this loom. Punch holes three eighths of an inch apart on the short ends. Cut your warp threads a few inches longer than twice the length of the loom. Draw the threads through the holes and across to the back, tying the ends of each thread together in the middle of the back. Baste the outside warp threads down



SIMPLE BASKETRY

1, 2, 3, simple basketry materials; 4, a simple basket; 5, chair seat of woven rope; 6, roller loom with heddle raised, showing shed

to the loom to prevent the weaving from pulling in. Weave the front of the loom and as much of the back as is needed for length. Finish the short ends with fringe.

Mock tam. This is a tam that a younger child may make. Measure the head size of the doll, and cut the loom with a diameter a little more than twice that of the head size. Make and string a loom as described for a round rug.¹ String with yarn. Weave the loom full to the edge. Then remove, and run a stout gathering string around the edge of the whole. Draw up the tam and add a pompon.

¹ See page 15.

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Basketry. Most forms of basket-weaving may well be deferred until later grades, as there is considerable muscular control required to start most baskets. However, if basket bottoms and flat wide reed are used, even a first-grade child may make a simple basket.

The materials may be purchased of school-supply companies. Occasionally broad grasses from the marshes or flexible willows may be used. Paper rope is another possibility. If desired, the bottoms may be prepared at home, by perforating wooden circles with an awl or with the brace and bit.

Insert burned matches or other available sticks into the holes perforated around the edge of the basket bottom. Then weave the well-soaked reed around the sticks. A large handle that encircles the whole basket will give it a pleasing shape. It may be made of two pieces of reed intertwined. The ends of the handle may be inserted between the two layers of the bottom of the basket or be securely held to the bottom with tacks.

Occasionally a need arises for using weaving in the making of some piece of doll furniture. For example, the back and seat of a wooden chair may be woven of flat reed or rope. Sometimes a reed lamp shade may be imitated by weaving raffia around toothpicks stuck into a little cork.

CHAPTER II

SEWING

Children have even stronger motives for sewing than for weaving. Besides the need for dolls' clothing and furnishings, there is also the need for simple costuming in the many plays of childhood. Again, there are toys and games and other play equipment that require the use of sewing. Making simple gifts for parents and friends offers another motive.

Sewing to be done by young children must be carefully planned with health values in mind. Only coarse materials may be used, and coarse results expected, if children are to be protected from nervous strain. Since we are making use of the finer muscles, long periods of sewing are not allowable, and children's posture and the lighting of the work must be watched. A point to remember is that activities initiated by the child himself are never so taxing to his nervous system as the tasks we ask him to do. We may therefore find children doing fine-muscle work in their play, which is a matter of spontaneous attention with them, but when we ask them to do the same thing in school we sometimes forget that there is likely to be a greater degree of forced attention in that case.

Sewing in primary grades should be done when there is a real reason for doing it. As a mere activity for its own sake it has little to commend it for young children. There seems to be no good reason for considering the sewing of designs on cards an educational experience. Such cards

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are not useful in any vital sense, they are not artistic, they offer no problems to solve, and on the whole they smack of the artificiality that is being so largely replaced with activities arising from situations in real life. Children seem to learn best how to sew by using real textile materials; they prefer to sew real things if they have a choice, and if, as some urge, children "like" to sew cards, we can answer that children may do all they like of it out of school, but that we may scarcely justify it as an educational activity on that ground alone.

SEWING MATERIALS

Unbleached muslin is very usable in children's sewing, for it is soft and inexpensive, and it combines well with colors. Colored cambric is another inexpensive material that comes in a variety of colors. Burlap is useful when loosely woven cloth is desired. If necessary, scraps and worn pieces of cloth make very acceptable substitutes, especially when dyes are used. Old garments and flour sacks may be brought from home. Felt is a good material for some purposes since it requires no hemming, but its expense makes its use very limited in most schools.

CARE OF RAW EDGES

Little children hem with such difficulty that it is well to think of other ways of treating raw edges. Sometimes a long piece of cloth is torn instead of cut, and the torn edge is left as it is. One substitute for hemming is fringing, when appropriate. With a pin the threads are fringed out for a little way. Another substitute is clipping the edge in tiny points or scallops.

Sometimes a child can turn a hem easily, but instead of attempting the regular hemming stitch he merely runs

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a colored yarn along the hem with as small stitches as he can do without strain. On the whole, work with yarn looks much better in children's sewing, no matter how crude, than the same work done in sewing thread. The coarse and uneven stitches strike a balance in color. Older children, in the second and third grades, learn to do an overcast stitch or a blanket stitch.

Sometimes it is desirable to fringe round doilies. To do this draw a circle to mark the beginning of the fringe, and another one to mark the outer edge of the doily. Either machine stitching or stitching by hand should be done all around the inner circle. Cut out the doily, and then with a pin fringe all the space outside the inner circle. When the border is completely fringed, the stitching may be covered with outline in color.

. HABITS TO TEACH CHILDREN IN SEWING

It is necessary to teach children the need of making a pattern before cutting into material. Plain wrapping-paper is good for experimental work in formulating ideas. Newspaper is good unless the children find the printed lines confusing.

Children should always be urged to lay a pattern on material in the most economical way, no matter how much cloth they may have. They may also learn how to lay a folded pattern on a fold of the cloth, how to pin a pattern down, and how to baste or pin cloth before sewing.

Very small children should do most of their sewing with yarn or very coarse thread. They may learn to fold the end of the yarn tightly around the point of the needle and then to slip the eye of the needle over the folded yarn. The thread or yarn should be tied to the needle, rather than doubled. Children soon learn to knot thread.

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From the first, children should form habits of caring for cloth by smoothing and folding, and should be encouraged to take care of needles, thread, and all equipment. Care in the use of scissors so that they do not become broken should be stressed. Little children need sharp-pointed scissors to do good work. Experience proves that injuries do not occur. The possibility of injury is of course there, but even in groups of four-year-olds no accidents have taken place in the writer's experience. However, children must learn to sit still while working with scissors, and they must learn to carry them only by closing the hand over the folded sharp points.¹

Articles for holding sewing materials, such as bags, sewing stands of clay or wood, or boxes fitted up for the purpose, are described elsewhere.² They make the care of the materials somewhat more attractive.

Sometimes a primary room has a small sewing machine upon which children learn to sew successfully. Some of the newer of these machines are very easy and safe to operate.

DECORATION IN SEWING

Articles made of cloth may be made more decorative in a number of ways. This is a good opportunity to stress the art impulse and direct it.

Wax crayons. Ordinary wax crayons may be used. Press down rather hard while outlining or filling in designs. Turn the material over and press with a hot iron on the wrong side.

Simple embroidery stitches. Yarn or floss on cloth, or raffia on burlap, may be used in simple embroidery stitches. Children should work out their own designs in paper and crayon. Outlining is done by the younger children by running small stitches. Older children can do a regular

¹ See pages 136-137.

² See pages 76 and 178.

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embroidery outline stitch. Simple French knots, feather-stitching, coarse stitches to form a design, lazy-daisy stitches, and other simple effects are perfectly feasible for primary children.

Colored yarns and colored raffia may be drawn into burlap after some of the threads in the cloth have been drawn out. Yarns, raffia, or even jute and roving are often couched down on material, especially on burlap, with good effect.

Cross-stitch is effective on checkered materials. Children may use squared paper for working out their designs, which may be borders or little conventional motifs or solid figures of animals or fruits. Checkered cloth lends itself to other kinds of fancy stitches as well. Children enjoy experimenting with this idea.

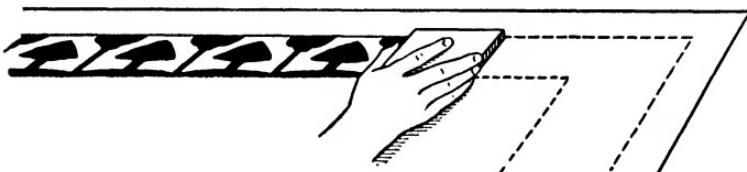
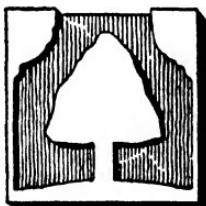
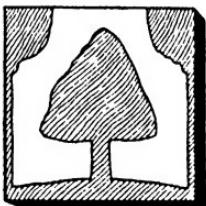
Appliquéd. Appliquéd is feasible if simply done. The youngest children cut out spots of colored cloth and paste them, unhemmed, to the curtain or clown costume or whatever it is. Children a little older may sew the appliquéd portions on with running stitch in color. Still older children may buttonhole the pieces on.

Stick printing. Stick printing may be done with pegs of geometrical shapes purchased in sets from school-supply companies, or with sticks made and collected by the children. Corks and soft pine wood may be cut into various shapes; spools, matches, and tiny wooden beads are also available for printing. Even potatoes may be cut up and dipped in color, but, of course, do not keep. Water colors or dyes may be used for cloth, and house paint or enamel for oilcloth or wood.

This is a simple way to use stick prints with water colors: Mix paint and sufficient water in the mixing pan of the paint box. Dip the end of the stick into this mixture and brush off the surplus paint on the edge of the pan before

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printing. Another method is to paint the end of the stick with the paintbrush. When ready, transfer the stick to soft paper or cloth. The child learns to become critical of the imprints he makes. Too much water makes a leaky print, and pressing unevenly or too tightly or removing the stick carelessly each has its effect on the impression made. Towel paper makes good material for experimental printing. As soon as children can make good prints they

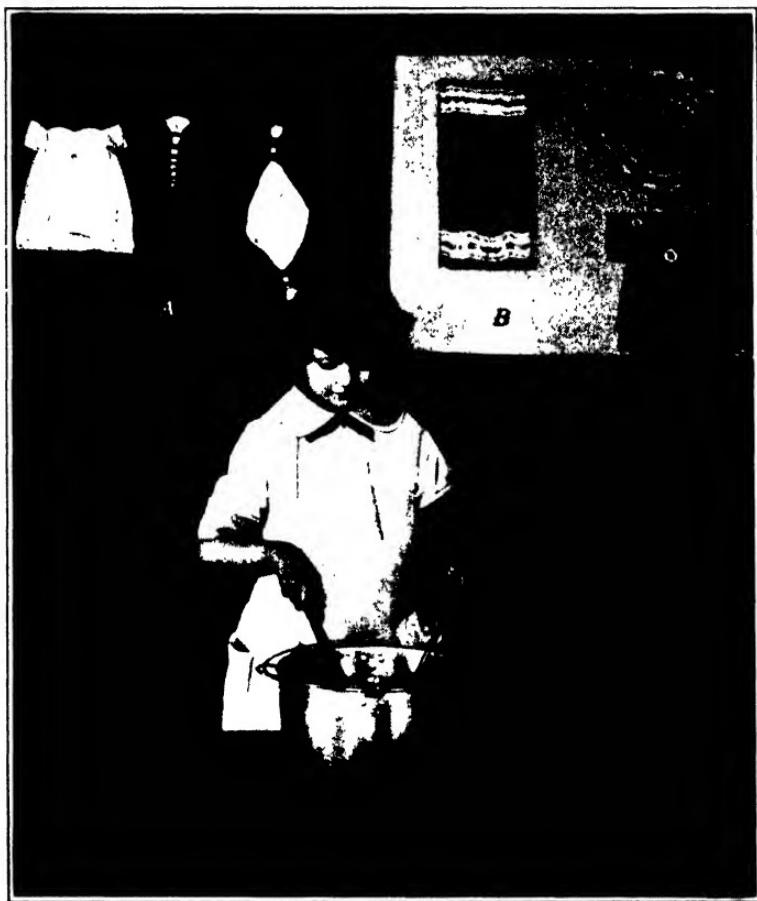


A BLOCK SKETCHED IN, CUT OUT, AND IN USE FOR PRINTING

are ready to work out a design. Folding a piece of paper into sections and cutting a row of scallops offers a good starting-point for easy application of a stick print to each scallop. Sometimes one stick print may be put into the center of a check in checkered gingham as a motif of decoration.

Block printing. Block printing is similar to stick printing in the general idea. Blocks may be purchased from school-supply companies. They are small wooden blocks covered with a layer of linoleum. One can make these blocks by tacking or gluing linoleum to wood. The design

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TIED-AND-DYED WORK

A, runner, centerpiece, and doll's dress tied for dyeing; B, the same, dyed and pressed

is drawn on the linoleum and, for convenience, may be painted or chalked over. Then with a sharp knife the entire background is chipped away. A small screw or knob may be put into the wooden back of the block to serve as a handle. Little children can scarcely make the blocks,

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but they would enjoy using them for decorating if teachers could cut them out. Older children may cut simple designs for themselves. When the block is cut, a little linseed oil rubbed over it makes it ready for printing.

Use water-color paint with a little water and a tiny bit of mucilage. Soak a small felt pad with this mixture. If black is desired, the printing-press pad of ink will do.

To print, press a block evenly on the saturated pad, and transfer it to a trial piece of washed cloth which has been laid on a soft pad of cloth and pinned. Make several trial impressions before trying on a good piece.

Tied-and-dyed decoration. Tied-and-dyed decoration is very effective and the process is very easy and enjoyable. To experiment with the idea take a piece of cheesecloth, tie the center tightly with a piece of string, and dip into cold boiled dye. Take it out and dry it, then cut the string, open, and wash in clear water. If permanency of color is not important, the dye may be merely dissolved in hot water and cooled. If permanent color is desired; the dye must be boiled. For allover design tie the material at regular intervals, tying each portion of cloth as many times as you wish concentric circles in your design. For the border of a runner, catch the ends of the runner evenly, and tie it in several places. More advanced ways of using this idea may be worked out as the children become more experienced. House furnishings, gifts, and costumes may be decorated with tied-and-dyed designs. The tied parts will always be lighter than the background, since the dye affects only the latter.

DOLL-MAKING

Dolls may be made of old stockings, cambric, or other material, and stuffed with cotton. When the doll is made, the need for clothing and furniture follows very naturally.

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The doll, then, may suggest many problems and form a starting-point for many projects. Cloth dolls are often used as puppets; foreign or historical dolls are often used in connection with stories of the life of other peoples or times; occasionally dolls or animals are made to illustrate characters in books or stories to interest children in reading.

The parts of the doll. The doll is made experimentally by cutting patterns for the various parts and then improving upon them. Sometimes a doll is made in two pieces, front and back. In that case the head, body, arms, and legs are all in one piece. Cut the cloth out double by the pattern, sew along the edges, turn inside out, and stuff. Small dolls are often successfully made in this way.

A doll with separate arms and legs can be made as follows: Little children often make a head by cutting a circle of old stocking, putting cotton in it, and gathering all the edges into the neck. A better way is to cut two circles or ovals, sew a seam around the edge, turn, and stuff. The body is made of two rectangular pieces sewed with curved corners, turned inside out, and stuffed. Head and body should be securely sewed together, and there should be enough stuffing so that the head does not wabble. Another way to make this part of the doll is to make the head and body in one. When it is stuffed, tie a thread tightly around the neck line, marking off the parts in that way. The arms may be pieces of cloth folded over and over for thickness, or they may be folded once, turned, and stuffed. A second joint may be made by sewing across where desired. The hands look more realistic when slightly fashioned with needle and thread to look more like fingers. The legs may be made in two parts, each stuffed and joined, or in one piece, turned, stuffed, and sewed straight across at the knee joint. The foot may be cut in the shape of a shoe. The feet always look better when

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covered with simple shoes of cloth or oilcloth. Sometimes the top and buttons of the shoes may be merely indicated with embroidery in outline stitch and French knots.



CHILD AND BABY DOLLS MADE OF OLD STOCKINGS

To make a realistic face is something of a problem. Sometimes a colored face may be cut from a magazine advertisement and sewed over the cloth face of the doll. A hood or cap covers the head and conceals the edges of the paper. It is better to find the picture before making

EDUCATION THROUGH MANUAL ACTIVITIES

the doll. Embroidered features are much used. Pen and ink and water-color paints are used successfully if children have some good models and are allowed to practice. Beads and buttons sometimes serve as features for clown dolls or other character dolls.

The heads of dolls may be satisfactorily covered with caps, hats, or other headdress to obviate the necessity for hair. If hair is desired, old dolls' wigs or discarded human hair may be sewed on. Wools, yarns, and even soft rope may be frayed out for hair. The artificial hair formerly used by women to pad the hair is another possibility, and hairdressers sometimes sell tightly woven strands of artificial hair that may be unbraided and used for dolls. Cotton is good for white or powdered hair; raw wool also makes white wigs. Occasionally a cambric doll's head is cut the shape of the head and the hair together. The hair part is then painted or embroidered.

Kinds of dolls. White stockings or cloth may be made into baby dolls and dolls representing little children, Dutch folk, or any other white people. Black material may be made into negro dolls, which are appropriate in school since children sing negro songs, hear negro stories, and listen to negro music. Stockings are raveled out or cut into small shreds and sewed on for kinky hair. Colored kerchiefs and other characteristic clothing make these dolls attractive. Brown material is good for Indian dolls. Black yarn for hair, and old kid gloves cut into fringe, besides beads and feathers, help to make them realistic. Sand-colored stockings are good for Japanese or Chinese dolls, with black-yarn hair piled on the head or braided.

Besides making national dolls, one may make character dolls of some particular kind; for instance, a clown. Here costuming plays an important part, as in all doll-making. Any color of stocking, such as white, tan, or

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black, will do to make the clown. The pointed hat, the ruff, the full, parti-colored costume, all offer good problems. Sometimes the dolls are made with very limp arms



CHARACTER DOLLS MADE OF OLD STOCKINGS

and legs so that they can be used as string puppets. These are described elsewhere.¹ A brownie doll may be made by covering an old tennis ball with a piece of brown stocking and fastening to it a head made of a stocking and

¹ See page 205.

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stuffed. The arms and legs may be pieces of cloth folded and wired. Jolly features are embroidered; with ruff, hat, and buttons added the result is a brownie that will dance and bounce about. Bathtub dolls may be made of Turkish toweling stuffed with pulverized cork. A doll may also be made of a pair of the blue-and-white socks that are worn by men. One white toe forms the cap, a colored part of the sock the sweater and trousers.

Dolls' clothing. Both boys and girls like to sew for dolls at first, but later in the primary-school period we see that the little girls most closely imitate the activities of their mothers. The approach to the doll's dress should be experimental. Very young children often wrap dolls in cloth and sew them in, or lay the doll on the cloth and cut around it. A child can learn to do his experimental fitting with soft paper. He may cut out one pattern, try it on, criticize it, cut another, and so on until his pattern is perfected. Cheap paper napkins and thin wrapping-paper are both good.

The teacher can lead the children by discussion to observe real garments and establish some standards of garment-making. For example, children may examine one another's garments to discover that no raw edges are left on the outside and that there are certain characteristics, such as underarm seams. Costume standards should include discussions of the suitability of particular garments, the comfort of clothing, and the ways and means of making it attractive to the wearer.

The kimono or smock type of garment is frequently evolved by children. It obviates the necessity of making separate sleeves. Some ideas for hat-making and the preparation of costumes, which are discussed elsewhere,¹ are also applicable here.

¹ See pages 50 and 153.

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HOUSE FURNISHINGS

The need for making draperies, pillows, lamp shades, and bedding is always present in connection with doll houses and playhouses. Children learn to fold a circle over and over through the center and cut scallops in it. They can fold the ends of a runner over and over and cut scallops, thus making definite places for design. The making of window dрапery with or without valances, luncheon sets (a cloth and napkins or a set of doilies), braided or hooked rag rugs, fringed burlap rugs with drawn-in color, all offer opportunity for the emphasis of art values. The situations and possibilities are so varied, and the doing of this work is so familiar to most women, that it does not seem necessary to give full details. It is important that children should participate in the planning of these articles and should solve the problems in connection with them. The doll house is an excellent agency for stimulating interest in home decoration and care of furnishings.

Hooked rugs. Since this activity is not common in the primary school, some directions may be of value to teachers who have not tried it. These rugs, when small and simply



MAKING A HOOKED RUG, AND TWO FINISHED RUGS

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done, are within the range of primary children's abilities. For experimental purposes take a small piece of ordinary coarse gunny sacking or burlap. Make a four-sided frame of strips of wood. This frame must be a few inches larger all around than the piece of sacking. With a coarse needle and cord overhand the sacking to the frame so that it will be held taut within the frame. When the cloth is tightly stretched on the frame, draw on the cloth some simple design, such as a border and a center motif. This may be done with chalk or colored crayon or paint. Rags sewed as for carpet-weaving, or cotton roving or heavy yarn bought for the purpose, may be used. A special hook may be bought at a needlework store, or one may easily be made of a long nail driven into a piece of wood. The head of the nail is then removed and the end bent to make a hook. To do the hooking, hold the roving or rags under the frame with the left hand. Hold the hook in the right hand and poke through a hole, bringing the yarn up through the hole. Leave a small loop in the yarn, then put the hook into a hole close by and pull the yarn through again. The idea is to cover the top of the sacking with these little loops of yarn. Pull the various colors up to form the design where they are indicated in the sketch. The rug may or may not be shorn with the scissors.

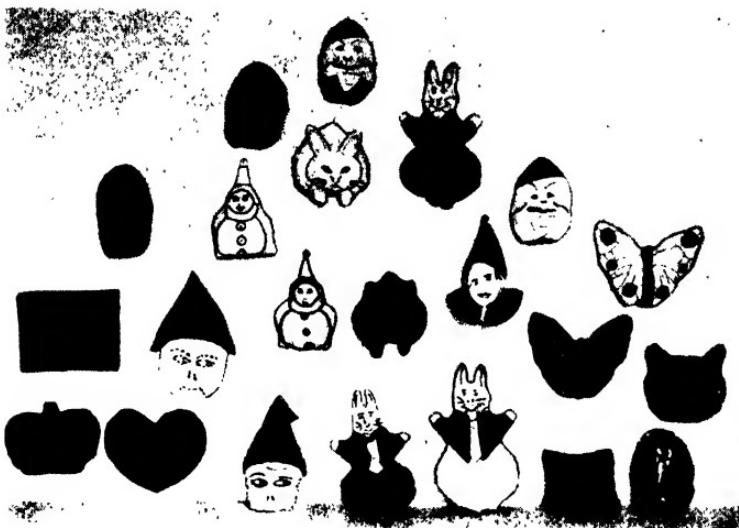
TOYS AND GAMES

Stuffed animals. Toy animals may be made. Take a good animal pattern and cut two pieces of cloth by it. Features and parts may be outlined in black, and other decoration, such as appliquéd parts, may be put on. Then, when the outer edges have been sewed together, the cloth may be turned and stuffed. This makes a soft animal. Use old stockings to make cats, woolly material to make sheep,

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flannel to make elephants and bunnies. A discarded piece of fur often can be made into an attractive animal, even if it has to be mounted on a board.

Marble bags. During the season for marbles bags may be made to hold them. Any cloth will do, but mosquito netting is especially good because the marbles may be



SOME GAY BEAN BAGS

seen through the meshes. Colored yarn is used to overhand the edges and to run in as a draw string at the top.

A very young child may make a marble pouch out of an unhemmed eight-inch square of mosquito netting. He may place a saucer in the center of the square and draw a heavy pencil line around it; then he may run coarse yarn stitches around the circle, tie the ends of the yarn together, and pull it up to make a pouch.

Bean bags. Many attractive bean bags may be made of unbleached muslin or burlap or cambric. Oilcloth is an-

EDUCATION THROUGH MANUAL ACTIVITIES

other interesting material. The edges of the bags are either sewed and then turned or they are turned in first and then overcast or buttonholed in colored yarn in contrasting color. Bean bags should be done in strong contrasts and posterlike effects. Facial features or other designs are effective when outlined in black. Parts, such as vests, caps, and the like, may be put on in appliqué. A tassel sewed to the point of a clown's cap and a cloth ruff put around the neck add effect without interfering with the throwing of the bag. Similarly, a braided yarn queue is sewed to the bag shaped like a Chinaman's head.

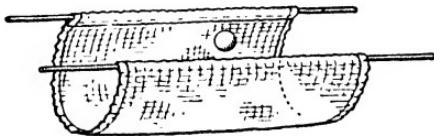
As to the form of the bag, there are many shapes of interest to children. First of all may be mentioned the square, oblong, or round bag of any material. This is first sewed up and then decorated with stick printing, embroidery, or appliqué. The jack-o'-lantern bag is made of orange with black markings. A clown's head with pointed cap, a Chinaman's head of tan with black-yarn features, a butterfly on which spots of color are appliquéd, a squatting rabbit or a tall Brer Rabbit with fancy vest and coat, an egg-shaped Humpty Dumpty with gay skullcap, collar, and tie, — these are some of the possibilities in bean bags. Any good pattern whose parts are not too spread out and that will be a convenient object to throw about in play will serve the purpose. These bags make attractive toys to own or to give away.

Ball-and-net game. Cut a piece of cloth, such as burlap or cambric, twelve by eighteen inches. Cut two pieces of elastic cord sixteen inches long and slip them through hems turned on the long edges of the cloth. Fasten the ends of the elastic to the cloth. Slip thin dowels or straight twigs each fourteen inches long through casings made in the short ends of the cloth. This will make a slightly cupped net. An old tennis ball, or a ball made of cloth and stuffed,

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is used in playing with the net. A child may play alone by opening the net rapidly, letting the ball fly, and catching it. Two children may play together, using two nets and catching each other's balls.

Doll swing. This may be made from the tin-edged top of a fruit basket nearly a foot square. Cut this top off and use it for the frame or stiffening over which to fasten the swing. For the seat, cut four cloth sides as wide as the basket and as deep as desired, perhaps ten inches. Sew the four sides together and turn the top of the four-sided result over the frame. Sew into this hollow square a bottom to fit. In one of the sides cut two holes for the doll's feet. Suspend the swing by tapes sewed to the four corners and joined to a ring above. Sometimes children construct a wooden frame to hold the swing.



NET GAME

Chuck-o'-luck. This is a Mexican game that may be used for number games. The dimensions here given are merely suggestive. Out of strips of wood an inch square construct a triangular frame eighteen inches on a side. Cut a triangular piece of cloth the size of the frame plus a two-inch margin. Cut three holes, each three inches in diameter, in the cloth and attach little cloth bags to the under sides of these openings. These sacks are to catch the bean bags. Now stretch the material tightly across the frame and tack underneath. Calendar numbers may be pasted under the openings, or numbers may be embroidered in contrasting color. Make some bean bags to play with. Set the frame up on three legs, raising one point of the triangle on a leg about two inches high and the other two points on legs three inches high. Set the

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frame up with the short-legged point facing toward the players. The children stand six feet away to throw their bags. Various kinds of scores are kept.

Doll carriages and bassinets. The dressing of these baskets is full of interesting problems. The construction of the articles themselves is described in the chapters on "Woodworking" and "Making Use of Odds and Ends."¹ Sometimes an old basket is entirely covered with cloth both inside and outside. If the basket is in good condition, it may be painted outside and lined inside. The bottom may be fitted with a foundation of cardboard padded with cotton and covered with a piece of cloth that is glued on underneath; or a thick quiltlike pad may be made. A gathered strip may be tacked to the inside all around the sides of the basket; the canopy top may be nicely arranged; and cushions and coverlets may be made if desired. Ruchings or rosettes of lace and ribbon make the whole thing more attractive.

GIFTS

Bags. There are several useful bags that children may make either for themselves or for others. One thing to remember about bags with draw strings is that there must be two strings drawn into the bag in opposite directions. Burlap with decoration of colored raffia stitches, or drawn-in strands of colored raffia or yarn, or designs couched down in roving or jute are all attractive. Cross-stitching is effective on bags; appliqué and simple embroidery are possibilities.

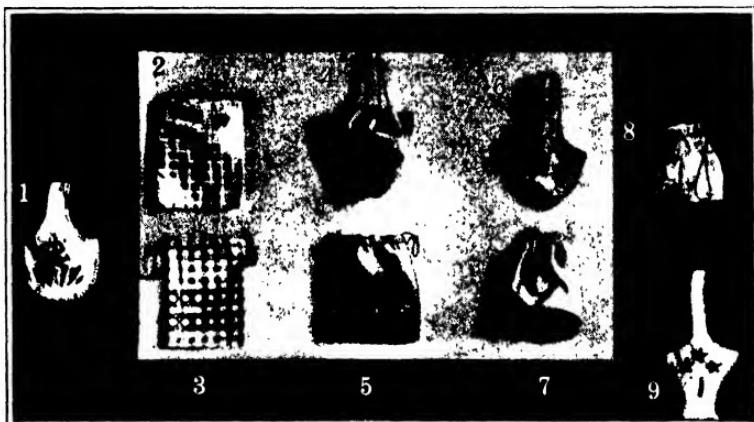
Some types of bags will be described. There is the square or oblong kind which has a draw string around the top or has cloth handles connecting the centers of the

¹ See pages 176 and 103.

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front and back. Sometimes the tops of the bag are sewed over cardboard strips for stiffening.

A bag to hold buttons or a dustcloth is made of a circle of cloth about ten inches in diameter. Turn in a hem and overcast or buttonhole in contrasting yarn. At intervals of a few inches sew little brass rings to the edge of the bag. Twist cords of contrasting color and draw through



CLOTH BAGS

1, appliquéd design ; 2, stick-printed bag ; 3, cross-stitched bag ; 4, round button bag with brass rings ; 5, burlap bag with drawn-in colored raffia ; 6, burlap bag with couched-down roving design ; 7, tied-and-dyed bag with stiff bottom ; 8, marble bag of mosquito bar with yarn sewing ; 9, basket-shaped bag of oilcloth

the rings. The bag has the advantage of flattening out when buttons are needed or when a dustcloth is to be taken out quickly.

Another bag is made with a stiff round bottom. Cut two cardboard circles and cover one side of each with cloth. Take a strip of cloth as wide as the desired depth of the bag and long enough to go one and a half times around the circle. Sew the ends of this strip together.

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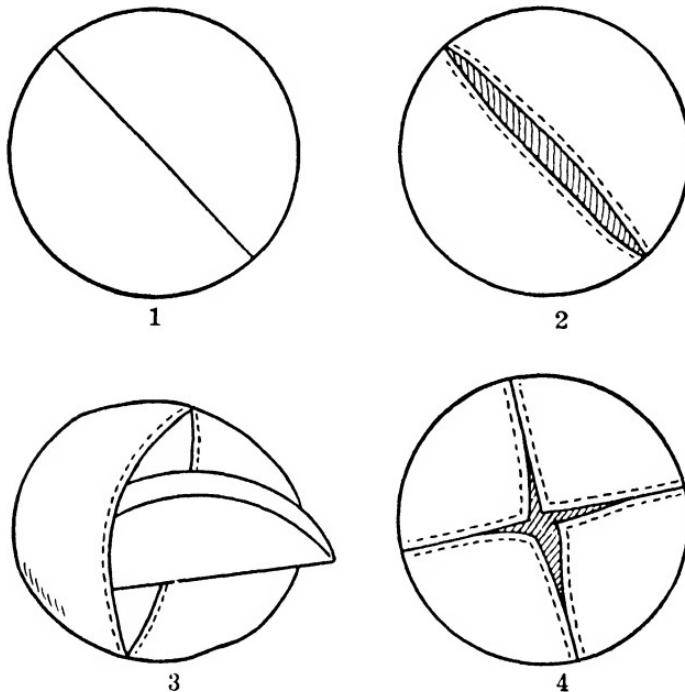
Now gather one long edge and fasten to the edge of one circle so that the seam is on the uncovered side when finished. Lay the other circle on the first and sew them together, covering all the raw edges. Insert draw strings around the top of the strip and draw.

Still another type of bag may be made by using some form such as a rabbit's head or a basket with a long arched handle. Outline the features of the rabbit on two pieces cut alike. Now sew up the two pieces around the bottom and part way up the sides, leaving an opening at the top. Sew the tips of the ears together to form the handles. In the case of the basket the handle is left open to arch over the bag, which is formed by sewing the sides of the basket. Oilcloth is especially good for this basket bag. Other bags may be simply adapted to children's ability to plan and sew. Many utility bags may be made for special purposes, such as for holding tennis shoes, sewing materials, and the like. It is possible to use new dishcloths of the coarse-meshed variety for bags, running in colored roving or yarns, or using coarse cross-stitches.

Holders. A kitchen holder is always acceptable to mother. It may be made of any dark material. A simple one is made square or oblong in shape. Cut a piece of cloth twice the size of the finished holder, allowing enough for deep seams. Pin or baste to this a piece of old stocking or flannel that is the size of the first piece of cloth, omitting the seam allowance. Now turn the edges of the outer, or covering, material over the flannel and pin or baste. Then double the whole over, leaving the original shape with two thicknesses of padding inside. The edge may be overcast in colored yarn all around the four sides, and the holder may be suspended by a ring or a tape. A bag for holders is made of two squares, sewed together on two adjoining edges. A handle connects the two other corners.

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A holder for hot dishes is like a kitchen holder, only daintier, and is serviceable in handling hot dishes at the table. It may be made of unbleached muslin or light-colored ginghams, and decorated with simple embroidery.



HOT-DISH MAT

1, the hinged foundation; 2, the cover; 3, the manner of putting them together; 4, the cover cut twice to hold an unhinged foundation

Sometimes a holder may be made oval in shape, and a patch pocket may be sewed on one side. The hand may be slipped into this pocket while handling hot things. Another idea for a holder is that of making it double; that is, making one for each hand. A pattern is cut so that the finished article will be about eighteen inches long.

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The ends are broadened into the shape of a holder, and the connecting length may be narrow and shaped into the ends prettily. These holders may also be fitted with pockets for the hands.

A mat for hot dishes. The foundation of the mat is a pair of round or square cardboards covered with flannel or other white material for thickness. These boards are overhanded together around the edge. A little child may make a simple, dainty doily or envelope slip to fit over this foundation. A more advanced child may make a slip-on cover, removable and washable, in this way: Cut two circles of cloth to fit the mat, allowing for seams. Sew them together and turn. Now cut the second circle across twice, the cuts being at right angles to each other. In other words, you will have one circle cut so the cuts form a cross in the center. Do not cut too near the seam. Now turn in and buttonhole all raw edges. When this cover is decorated and completed, it may slip on over the mat.

Another way to make a mat that can be taken from its cover is this: Cut the cardboard foundation in two. Leave the foundation flannel whole and sew it on as before. Then sew through the cloth in the place where the cardboard was cut. What is wanted is a foundation that will fold over, or be hinged. The outside cover for this may be made so that one side is divided into two semicircles. This will make an opening to admit the hinged foundation.

Pincushions. Children may make simple cushions. A pretty one is made of natural-colored burlap, perhaps three by five inches. The children may design a Christmas tree for the center. This may be done with crayons and paper first, so that four strokes, or four stitches of dark-green yarn, will form the tree. The edges of the cushion may be overhanded in the yarn. Some of the designs for bean bags make interesting pincushions for children's use.

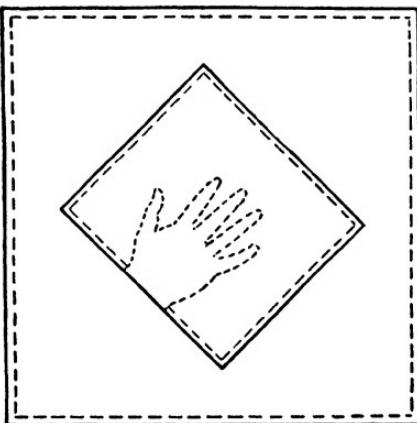
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A pinboard. This is made of two rounds or squares of cardboard about three inches across. Cover each with cloth decorated as desired. Then overhand the two covered boards together with floss or yarn. The pins are stuck around the edges, between the thicknesses of cardboard.

Needlebooks. Scalloped leaves of flannel are put between covers of burlap or cambric. The covers are decorated in the various ways that have been suggested.

Shoe-polisher. This may be made from an old black stocking, the thicker the better. Make a mitten without thumbs to slip over the hand. This is done by cutting two pieces, one for the front and one for the back, and sewing them together. On the front embroider in color the features of a negro face. On the back sew ravelings or thin shreds of stocking to look like kinky, woolly hair. The woolly side is worn in the palm of the hand while dusting or polishing shoes.

Glove duster. This is a good gift for mother, or may serve as an incentive to the child for dusting. Cut a piece of flannel of gray or some other color, about eighteen inches square. Hem with simple running stitch or button-hole in yarn of contrasting color. Now cut another piece about ten inches square. Turn the edges down once on three sides, and hem it on the fourth side. Now let the teacher lay her right hand on this piece while a child draws



GLOVE DUSTER

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around it. If the holder is for a child, another child may put his hand on for a pattern. Hold the hand on the square so that the wrist is at the hemmed edge, and so that the hand lies at right angles to this hemmed edge. When the pattern of the hand has been drawn, pin this smaller square on the larger diagonally in the center. Hem the patch down to the large piece on the three unhemmed sides. Then with running stitch sew the hand outline down through the two thicknesses of cloth. The hemmed side of the small square may also be caught down on either side of the wrist. This leaves the opening to put the hand into the glove. If desired, a little child may sew down a mitten design rather than that of the hand.

Kitchen doll. This is a possible assembling of several gifts a child may make for his mother. The foundation may be a wooden spoon, the bowl of which has been covered with a piece of tissue paper with a face crayoned on it. If it is impossible to secure the wooden spoon, a substitute is a stocking-darner made of a ball of clay and a clothespin. The hair of the doll may be the top of a dish mop made of roving by the child. This is described in the chapter on "Making Use of Odds and Ends."¹ Put the dish mop against the back of the head so that the strands of the mop fall about the face for hair. The doll may wear a dustcloth of cheesecloth for a skirt, and her shawl may be a square of coarse crash for a dishcloth.

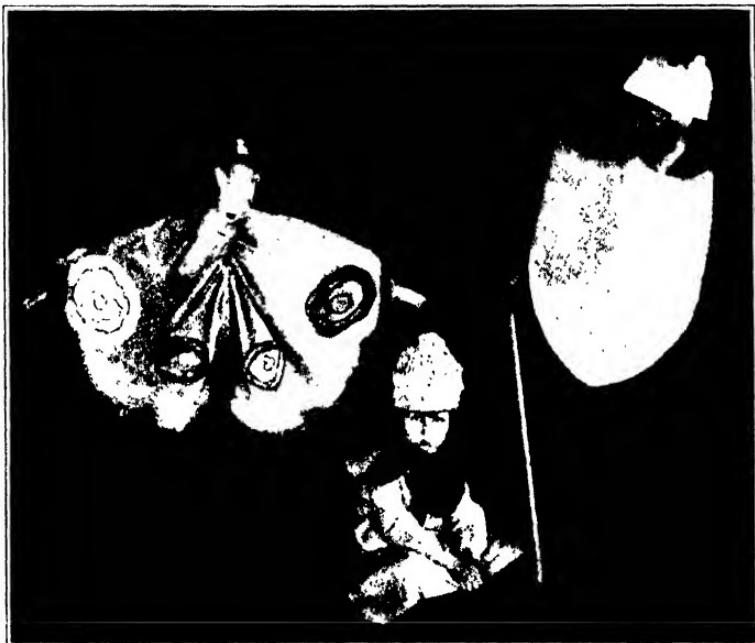
COSTUMING

Formerly when there was costuming to be done for a school program or festival the parents or teachers burned midnight oil to get the costumes finished on time. Now, however, children participate in costuming, for this is

¹ See page 184.

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considered one of the most valuable features of a festival. It is not urged that they can do all kinds of costuming or do it without aid, but it is decidedly in keeping with the idea of a festival that the costumes be a part of the creativity and enjoyment involved in children's self-expression.



CHILDREN'S COSTUMES

Cheesecloth butterfly wings with water-color spots; the four-leaved clover and blossom; knight with helmet, shield, and sword

Costumes are sometimes symbolic, for in the case of raindrops, sunbeams, spring, or fairies we have no real, specifically true characters. We must develop the costume idea by sensing an underlying feeling or idea and seeking to embody it in color and form. For example, when we asked five-year-olds what color raindrop costumes should be,

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they returned from the window where they had been observing the rain with the suggestions of "gray" and "silver." More discussion brought out the ideas that rain comes down in stripes and in drops. Newspaper was used for trial patterns, and later gray cambric was cut into a tunic that was slashed into narrow strips around the bottom. The ends of the strips were rounded like drops, and into the center of each rounded end was pasted a "drop" of silver paper. When we asked the children what color the north wind would wear, they chose dark gray or brown. They pinned a long strip of cambric across a child's chest from one outstretched hand to the other. He blew out his cheeks and waved his arms. Several other suggestions were used to make the costume more comfortable and also more windlike.

Many costumes for children are imitative of specific things, and are less symbolic than photographic in character. Children can best get ideas about such costumes by reading and by observation, or by looking at reliable pictures if real observation is not possible. Animals familiar to children, flowers, or people with costumes for special trades or other situations may be actually observed. Good costume books are invaluable. Storybooks often have good pictures. Distributors of crêpe paper sell, for small sums, their various seasonal booklets describing paper costumes. Another very rich source of ideas for costumes is the magazines, in which there are many advertisements suggesting costumes. A scrapbook of these cut-out pictures will prove a great aid to teacher or parent. It is quite important, of course, that in representing real characters we stick to the truth as far as possible, in order that children may not get false ideas about the people of other days or of other lands. It is not necessary to reproduce actual materials, but the visual effect must be right.

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Materials for costumes. Many fine costumes have been made from old garments dyed and made over. There is a wealth of possibility where there is some imagination. No one should be afraid to indulge in this delightful form of self-expression, for with practice comes facility. When materials are to be purchased, the following suggestions may be useful: Cambric comes in many colors, is twenty-eight inches wide, and is very inexpensive. Cheesecloth in white and colors comes thirty-six inches wide and is cheap as well. This may be very nicely dyed in many beautiful shades. Tarlatan is a very open-meshed, airy material for fairies. It is wide and comes in pretty shades. Theatrical gauze or even very cheap cheesecloth, when dyed, makes interesting scarfs for dancers.

Crêpe paper, gold and silver paper, and other stationery materials are serviceable. Cotton wadding spotted with ink looks like ermine. Cotton batting makes good colonial wigs; raw wool and upholsterers' wool also make wigs and beards. Burnt cork, or grease paint from the costumer's or druggist's, is good for making up the face.

Seasonal costumes. Sometimes garlands of real or paper flowers worn with simple white dresses or smocks of pale green suggest spring. Dresses decorated with autumn leaves, either real or painted by the children, suggest fall. Woodland sprites may wear garlands of real leaves over the shoulder or around the head. Another simple way to suggest a season is by means of a scarf of colored cheesecloth over the shoulders with the ends held in the hands; for example, pale green would suggest spring. Thus the color and texture of the scarf might suggest winds, weather, and many ideas. Snowflake or ice costumes may consist of plain white smocks cut from cheesecloth and decorated with snowflakes cut from thin white paper. Icicle costumes may be smocks cut from white or pale-tinted tarlatan

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with the unhemmed edges dipped first into paraffin and then into Christmas snow. Hail costumes may consist of long closely fitting capes and hoods of gray cambric decorated with silver pellets.

The smock seems to be a foundation for many costumes, and a word about its construction may be given. The material is folded in two the short way, and a hole is cut for the neck. The underarm seam is shaped to fit. This makes a simple foundation with sleeves already in. The neck has to be hemmed to prevent stretching, but the bottom of the smock or tunic may be left unhemmed; in fact, that gives a better effect than hemming.

Flowers. Sometimes just a cap will suggest the flower. A clover head is made by making a two-piece cloth foundation shaped to a point at the top of the head. Cut fringes in narrow strips of pink and of white crêpe paper by holding several pieces together and cutting all at once. Sew these to the cap in successive rounds, holding a pink and a white together. Keep on until the whole head is covered. The child may wear with this headdress a collar of green cambric cut into four petals like a four-leaved clover. Other flower hats may be made by cutting characteristic petals of crêpe paper and sewing to a cloth foundation. The stem may be twisted pieces of green tissue paper attached to the top of the cap at the center. Sometimes children dress as flowers by wearing the petals of paper or cloth as a skirt, attached to a band that fits up as far as the armpits or around the neck.

Trees. Children may represent trees by wearing tights or long stockings and simple short tunics over them. The color of the costume is determined by the season shown.

Sunbeams. Simple colored scarfs over tunics may represent the colors of the spectrum; or they may be represented in this way: Use a simple sleeveless slip for a

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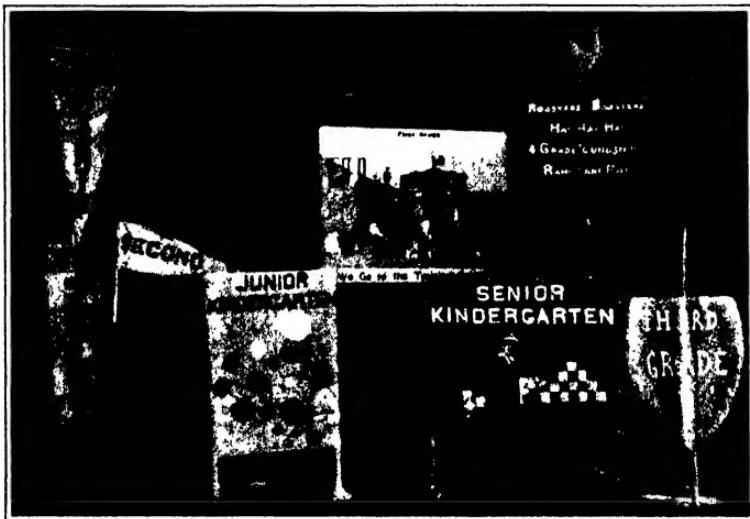
foundation. Cut six pieces of cheesecloth the size of men's handkerchiefs, and sew each one to the waistline of the dress by one point, these unhemmed pieces being considered rays of light. The six pieces and the foundation of the costume may be in several shades of one color. Each costume is based on one of the colors of the spectrum. The shades may be dyed by dipping into stronger and weaker solutions of dye.

Vegetables. These may be represented by headdresses. A pumpkin may be made of a circle of orange crêpe paper gathered around the edge to go over the head and draw up around the neck. Cut a mask out of ordinary paper and paste it inside the pumpkin, cutting corresponding holes in the crêpe paper so that the child may see and breathe. A green stem may be attached to the top. Tomatoes are made similarly. An ear of corn or a stalk of celery may be made of a piece of paper put around the head and slit and arranged at the top. Colored crayon makes the kernels more realistic, and water-color paints give the celery its shaded color.

Special days. Human valentines are made by framing a doorway or opening between screens with lacy shelf paper. Children are dressed and appropriately posed in the frame. Halloween, Christmas, and the patriotic holidays, as well as slogan days, are often occasions for processions through the corridors. Caps of individual design are encouraged. They may be worked out experimentally in newspaper, and, if no other paper is at hand, newspapers and wrapping-paper make effective hats when adorned with characteristic symbols in color. Pins and gummed tape are better than paste. Paper lanterns hung on sticks, masks, and witch hats are good at Halloween time. Witch hats are made of three quarters of a circle of black paper wound into a cone. For the brim take a circle

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of paper with the head size marked on it. Draw another circle an inch inside the head size, and cut out the remaining center. Then slash the margin of the head size every half inch. Bend up as far as the head size the pieces thus formed and paste or sew the cone over this foundation.



BANNERS AND PENNANTS

Each grade made a banner for the "pep" meeting in general assembly.
(Training School, Mankato State Teachers College)

Banners and pennants offer opportunities to stress school spirit or enthusiasm about health, thrift, or other movements which can derive impetus through concrete means. The simple flag or pennant, worked out in colored paper or cloth and attached to a stick, may be freely attempted by children of all ages. Other types of banners are the following: A banner or sign may be fastened to two sticks to be carried by two people. It may be stretched on a frame and carried by one central stick. A large flag may be carried by four people, each holding

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a corner. A banner may have a cord handle at the top which may be hung loosely on a pole. Shields may be used, carried on the arm by children, or mounted on sticks. A four-sided boxlike sign may be mounted on a stick, and may bear inscriptions on all four sides. Another type is the "sandwich board," either stiff or limp, which is merely a straight banner or frame worn on the front and back of a child; it hangs from a band around the neck.

In a Christmas processional where many children had to take part, simple short smocks were made. A hole was cut in the center of a large square of white cheesecloth, and this was put over a child's head. Each child carried something: one group carried red Christmas bells on sticks; another carried imitation candles constructed of paper, each with a little imitation flame of tissue paper; one group carried silver stars on delicate sticks; another carried wreaths made by the children.

Character costumes. Costume books offer many suggestions for kings and queens, courtiers and pages. A cape may be made circular or straight and gathered at the neck. The trimming may be strips of cotton wadding spotted with ink, or it may be gold or silver paper. Strips of the paper are folded several times, then cut in many places and unfolded after the manner of surprise cutting. Sewed to kings' robes, this makes a rich trimming. New sheeting with gold-and-silver-paper trimming is also good for royal personages. Sometimes the sheeting may be borrowed, used uncut, and returned. Crowns may be made of Manila tag, folded and cut into points and covered with gold or silver paper. Ruffs add much to costumes that admit of them. To make these, take a piece of paper eight inches wide and four times the desired finished length around the neck. Lay deep double box plaits until the

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extra length has been taken up. Stitch through the center of the ruff the long way of it. Tapes may be added, or the stitching may be done to a lengthwise tape. As the ruff is put on, the edges are flared out.

A page's costume may consist of tights or very long stockings and a tunic reaching to the knee. A tam cap with a drooping feather completes the costume. Sometimes a ruff is added. To make a plume, take three strips of colored tissue paper as long as the plume. Hold the three pieces together, and cut one end round. Sew a thin wire down the center for a stiffening. Now cut fringes in the edge of all the three thicknesses at once, and curl each separate piece of fringe with a hatpin or the back of a pair of scissors. Then pat the whole into shape and bend as desired.

For the knight a shield, sword, and helmet are needed. Cut a large sheet of Manila tag into the shape of a shield. Fasten to the back of this two loops of the tag, using brass fasteners with heads showing on the right side. Paint the whole with silver or aluminum paint. The helmet is made by cutting two pieces of tag into helmet shape by following the outlines of the head. Put the two together with brass fasteners, and add a chinband. Then make a bushy colored pompon for the top. This helmet is also silvered. The heads of the fasteners look like metal rivets. Swords are whittled from old boxes. A coat of mail can be imitated by gilding or silvering coarse-meshed dishcloths and sewing them together.

A clown costume is most easily cut after a commercial pattern. The children can cut out paper or cloth circles to paste on for gay spots. Ruffs and tall caps add much to the effect. By gathering strips of crêpe paper and fluting the edges, pompons are made for buttons, slipper decoration, and other frills.

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People have as many different ideas about fairies as they have different associations in imagination. Sometimes a dainty white dress with wings and headdress added makes a fairy costume. A simple tunic of soft white cheesecloth, with soft wings, or a more elaborate dress of tarlatan, made very fluffy, are possibilities. Fairy wings may be made of wire, over which tarlatan or cheesecloth is stretched. Wings may also be made of crêpe paper by gathering a length through the center. The edges should be fluted, and the wings tacked at the shoulders or gathered onto tapes and tied around neck and wrists. A headdress for a fairy may be a delicate band of gold paper or tinsel.

A fairy godmother is imagined by some as a kindly witch and by others as a dainty, dignified fairy, more or less like an angel.

A brownie costume may be simply made by cutting an all-in-one garment, like a child's sleeping-garment, of brown cambric. It also may be in two parts,—long brown stockings or tights and a brown tunic. A tall hat is made of paper, or a skullcap is easily made from the top of a stocking. Sometimes orange buttons and collars, and pointed cloth shoes with the pointed toes stuffed with cotton, are further possibilities.

People of other lands or times. Indian suits¹ are made of brown cambric. Boys wear long trousers. Khaki overalls will do, but if they are to be made it pays to buy a pattern. The coat is a short smock with long sleeves. Girls wear smocks reaching to the ankles. Fringed colored cambric is sewed around sleeves of Indian suits, down the sides of trousers, and around the neck. Cut the colored cambric in strips, sew into place first, and then cut the fringe. Old bits of leather such as gloves, clay

¹ See Appendix F, II.

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or paper beads, and feathers from poultry trim these costumes. Sometimes children work out designs by employing symbols as the Indians did. They crayon, paint, or embroider these designs on the suits.

Japanese and Chinese costumes are usually assembled by using colorful kimonos, sashes, and fans. There seems little reason for buying material for these. Good pictures aid one to remain true to fact.¹

Dutch costumes are easily devised. Boys may wear women's full, colored bloomers, and girls wear full skirts. Both wear gay sweaters and scarfs. Bright stockings add effect. A hat for girls may be made of a large circle of white tissue paper or cloth gathered around the face. Sew a wide doubled band to this cap, beginning just behind one ear and sewing across the front to the other ear. Turn the center section of this band back from the face and turn the points near the ears forward like the wings of the typical Dutch cap. Boys wear skullcaps made of black paper or cloth. A substitute for wooden shoes is made of stout yellowish wrapping-paper. Cut two pieces for each foot, like the side view of a wooden shoe. Sew these two pieces together and fit over the child's own shoe. The child thus dances on his own shoe soles.

For Pilgrim men² make hats as for witches, but square off the tops instead of leaving them pointed. Circular black capes, knee breeches, buckles for the shoes, and white-paper collars and cuffs complete the costume for boys. Pilgrim women are represented with long gray or black dresses having a waistline tighter and higher than is the custom now. A white kerchief is folded around the neck, white-paper cuffs are added, as is also a cap similar to the Dutch cap described.

¹ See Appendix F, III.

² See Appendix F, VII.



CHILDREN IN MANKATO STATE TEACHERS COLLEGE COSTUMED AS DUTCH CHILDREN

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Peasant bonnets or bonnets for old-fashioned grandmothers may be made as follows: A large square of white cloth is required, but a paper napkin may be used to experiment with. Lay the napkin squarely in front of you and consider the four edges as front, back, right, and left. Fold the front edge to the back edge and crease. Turn this same edge toward the front as far as the center crease, and crease. Now turn the whole thing over from side to side, not disturbing the front-and-back relation. With this position, fold from right to left and open, thus determining the center. Now fold so that the two halves of the folded edge meet at this front-to-back crease. This makes a triangle with the peak toward you. Now roll together the center back of the construction for an inch or so, and pin the little roll to hold it. This holds the back of the neck in place. With the left hand pick the cap up by this roll. Then insert the right hand into the fold that lies under the peak of the triangle, bringing forward the top of the cap. The two long points that hang down at the sides are to fold under the chin.

Animal costumes. For cats, dogs, frogs, and such animals we often use worn knit underwear suits, all in one, and pad the figure where necessary. Spots, stripes, and other markings are added with paint or pieces of cloth. Tails may be made of the knit material, firmly twisted around wire. Whiskers and masks add effect. A rabbit or a frog costume may also be cut by the pattern of a child's sleeping-garment, leaving the feet on. A cap extension covers the head but leaves the face free. Long pink-lined white ears of flannel with paper stiffening complete the rabbit costume.

Birds may be costumed in cambric. Measure a child with outstretched arms, from hand to hand. Make a separate front and back to reach from wrist to wrist and down

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to the knees. Seam on the shoulders and arms, tapering toward the wrists. The ends of the wings are pointed at the wrists, and the underarm may be shaped pleasingly and sewed from the wrist to the bottom of the tunic. The bottom of the knee-length costume may be slashed or cut into featherlike points. Sew on the front of the costume a colored bib for the bird's breast. The costume goes over the head by means of an opening left at the neck, and is tied at the wrists with tapes. Make a headpiece like a hood and attach to it at the top of the head near the child's forehead a bill made by pasting cloth over cardboard. The eyes may be drawn with crayon.

Butterflies may be made in several ways. A simple way is to take a length of crêpe paper, gather it through the center crossways, flute the edges, and fasten to the dress in the middle of the back. A more durable pair of wings is made by using cheesecloth of a soft color, gathering it to a center tape. When pinned to the back, the ends of the wings should reach to the child's hands when outstretched, and may be fastened to the wrists with tapes. Curve the outer edges to look like butterfly wings. Let the children take circles of cheesecloth about six or eight inches across and with water colors make the spots for the wings. After a little experimentation they can paint bright concentric rings of color on the spots, which are then pinned in place to the wings, and sewed on unhemmed. The outer edges of the wings may be touched with dark shading of water color. Pictures of butterflies give children ideas for these costumes.

CHAPTER III

CLAY-MODELING

Clay is one of the best materials for little children. Because it is so crude and so plastic, children of any age will find it adaptable to their purposes. Children should be given more opportunities to work with this medium of expression than are afforded in many schools at the present time.

KINDS OF CLAY

The best clay for most modeling is potter's clay, which is taken from clay strata in the earth and freed from sand and other foreign substances. Potter's clay may be purchased in three forms: First, it may be bought from potteries by the barrel, in solid, semimoist form. Secondly, it may be bought in small bricks weighing several pounds. Thirdly, it may be had in a powdered form called clay flour. The school-supply companies sell bricked and powdered clay. The distinguishing feature of potter's clay is that it has to be prepared with water, and it is brittle and breakable when dry.

Sometimes children find native clay in clay banks near the school. It is a desirable industrial experience for them to find this clay and prepare it for use. When it is pulverized, cover it with water, mix, and allow to stand. Strain through a cloth and soak or siphon off the remaining water. Mix until smooth. This clay will probably not be very pure or perfectly plastic even after it is prepared. It may be compared with better clays.

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Plasteline and plasticine are clays prepared with oil or vaseline, and designed for the same purpose as potter's clay. Their distinguishing feature is that they are always ready for use. Some, therefore, prefer oil clays to potter's clay for general purposes. However, there are many reasons for objecting to them: permanent articles are impossible, since oil clays are affected by heat, leave oil spots, and do not easily lend themselves to decoration; used in large quantities the oil clays are expensive. There are some very good uses for these oil clays if one considers them as substitute materials. For example, when one wishes a small amount of clay on short notice, to work out an idea in temporary form, the oil clay is very convenient. Owing to the slightly adhesive nature of the plasticine, it is admirable for modeling the head and feet of clothespin dolls, for making bases for paper trees or other things that are to stand up on a table, and for making some of the delicate figures required in illustrative scenes in which figures of potter's clay would be too heavy or too easily broken. For instance, it would be difficult to use potter's clay to model a monkey for a jungle scene, but with oil clay it could easily be done. Plasteline may be kept in jelly glasses tightly covered to keep out dust. Thus one finds oil clays very serviceable for supplementary purposes, but for ordinary modeling the regular potter's clay is greatly superior.

There are some clays on the market that are distinguished by their quality of permanent hardening. These clays come in pound cans and must be kept air-tight. When they do become hard through neglect, they may gradually be softened with water, but of course this is not desirable. Owing to the expense of these clays, and also to the fact that they cannot be used over again or worked on at leisure, because they get hard too soon,

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their use in the primary school is limited. Often, however, some little articles, such as are mentioned later on, may be worked out in plasticine first and then in permanently hardening clay. School-supply houses will send price lists of clay materials.

THE PREPARATION OF POTTER'S CLAY

The preparation of potter's clay must be begun several days before the clay is needed. Children can prepare clay themselves or at least can help to do so. The clay that comes in brick or barrel form must first be beaten up with a hammer or mallet into small pieces. Then it must be mixed with enough water so that when the moisture is absorbed the mixture will be like thick dough. Clay flour may just be stirred into water with a stick until the clay is of the right consistency, or the flour may be put into a cloth bag and lowered into water until it has absorbed the right amount. This clay may be kneaded in the bag if desired. From this point on, all three forms of potter's clay are handled in the same manner. When the mixture is thick and smooth, turn it into a slightly moistened cloth and alternately pat the clay with the edges of the cloth and then withdraw the edges, so that the cloth will not stick to the clay. Knead until smooth. If the clay is sticky, allow it to remain exposed to the air until it is right. When clay is in good condition for modeling, it is perfectly plastic but not sticky. When ready mold the clay into loaves, wrap in cloths, and put into a covered jar or chest. Since atmospheric and room conditions affect the process of evaporation, it is hard to say just how much time will be required for this preparation. Clay must be watched, however, until its condition is as desired.

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Clay is used over and over again, unless it has been painted. Often a solution of carbolic acid and water is added to the mixture in preparation to disinfect it. This solution should be prepared by a druggist. Moreover, children ought to wash their hands before using clay, and those with any suspicion of disease should be given a portion of clay reserved for them. During epidemics special care should be observed to avoid contagion through clay.

EQUIPMENT FOR CLAY WORK

Containers. A container, some sticks for stirring, and some heavy cloths for wrapping constitute the necessities in equipment for clay work. A large earthenware jar with a cover makes a good receptacle for mixing. A large tin lard pail or other container from the grocery store may be used to keep clay in. It may be set on a rack made of two pieces of wood nailed in a cross and equipped with casters. This makes it easy to pull around. When the metal rusts, the can must be replaced. A galvanized garbage can is another good container. Best of all is a wooden box that has been lined with some noncorroding and nonrusting metal. It should have an air-tight cover. Clay can be kept for a long time in good condition in such a chest. Sometimes a zinc-lined cupboard is also provided so that partly finished articles may be kept overnight without drying out. A wet cloth put around the articles may serve as substitute for such a cupboard. Newspapers wrapped around clay also keep out the air.

Table coverings. To protect desks or tables from contact with the clay, newspapers may be used, or oilcloth covers may be made to fit over desks or tables. However, the oilcloth is rather difficult to keep clean. Not only

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must the table be protected, but it is convenient to have a small board of some sort upon which to model. Then the article being made can be picked up easily on the board and turned about or held out at arm's length. Smooth little boards may be brought from home by children or purchased from school-supply companies. For lack of anything else, pieces of heavy cardboard may serve as these bases. Another base that is serviceable because of its absorbent nature is a disk made of plaster of Paris. Such a disk may be made by allowing a small quantity of water to absorb the dry plaster of Paris as it is poured into the water. Stir, then pour the mixture out at once into a shallow receptacle, such as a pie tin, that has been washed with soapsuds. Remove the disk when the plaster has set. This disk is good for working with clay that is a bit too moist, and forms a convenient base for making round articles such as bowls.

Tools. Children need very few modeling tools, as the thumbs and fingers are the best possible tools. The clay may be cut from the loaf with a knife or a string. Occasionally a child will make use of a small board for pushing and squaring. Tongue-depressors are good for pressing the clay and also for cutting away portions. A case knife is a good thing to have in readiness so that bulging places may be trimmed. To hollow out the inside of a bowl or to make a depression, the children often use a spool on a pencil or a hard ball or other smooth object. In the making of bowls or vases a measure may be used to aid in getting the article symmetrical. This measure, or *template*, is made by cutting the desired shape of the outer curve of the bowl from a piece of cardboard. This measure is applied from time to time to true up the outlines. A nail does for incising lines in decoration, and pencils or thin dowels are good for making perforations and grooves.

CLAY-MODELING

THE USES OF CLAY

In general there are two ideas underlying clay-modeling. First, clay is an excellent medium for expressing free imaginative ideas. Things seen or imagined, either in real or in fancied life, are made purely for joy in the activity. This free expression is comparable to crayon or brush drawing or to free-hand paper-cutting.

Secondly, clay is beautifully adapted to the making of a large number of artistic and useful articles which children may make for the schoolroom, for themselves, or for parents and friends. In many instances the distinction between the free expression mentioned and the making of some article which has a definite ornamental or practical purpose is not made by the child at all. These may be distinguished more easily by adults for purposes of teaching. When a child models animals or story characters, what guides him in his representation is the actual or imagined animal or character. In other words, he is trying to make true imitations of established forms. However, when a child models a vase for his mother, or a pencil-holder for his father, he must keep the intended purpose of the article in his mind. It is this purpose, rather than some already established form, that guides him.

SOME CONSIDERATIONS OF TECHNIQUE

Clay is a material that lends itself better to heavy, massive effects than to delicate ones. Because clay becomes brittle when dry, thin edges or delicate appendages crack and break off. It is therefore better to keep heavy walls, dull rather than sharp edges, and to refrain from working out in too high relief such things as arms, legs, tails, and ears. These may often be suggested rather than modeled

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in too great detail. Since clay is of considerable weight, clay animals sometimes do not stand up on their legs. A little base should then be added, and sometimes the legs can be merely suggested in low relief on this base. A clay hen would never stand up on two legs of the right proportion, but a base of clay would make this possible. Similarly, a clay cup could not be picked up by its clay handle unless the handle were left solid with just a depression for the thumb and finger.

It is never wise to put on separately legs, tails, or any appendages in clay, for when dry those parts will surely come off. When modeling an animal, for example, always pinch the appendages out from the mass. Handles of dishes must likewise not be added but must be made as a part of the whole.

The first handling of clay will be purely experimental. The results will be more or less accidental and manipulative in character. The teacher should encourage children to make use of early efforts by helping them to see chance resemblances in what they have done, and by creating satisfaction with more conscious changes; thus the child who has accidentally made an object that looks almost like a house will gladly add a chimney or other features suggested. This often forms the transition between mere manipulation and expression of ideas. Simple articles that are typical of early ideas are worms, snakes, cigars, and marbles, all suggested by rolling the clay. Candy, pastry, fruits, vegetables, toy dishes, animals, people, and many other representations follow.

Little twigs for fruit stems, strings for tails, and even sticks for legs, are proper in early work. Stones and pebbles for nuts and raisins, shredded white paper for coconut, and paper wrappers and sticks for candy-making in clay, — all these as supplementary materials help the child's imagina-

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tion. Candy and pastry may be tastefully arranged on paper plates or on trays to stimulate better modeling. Fruits and vegetables may be made for the school grocery. Tissue-paper foliage may be stuck into the tops of carrots and beets while the clay is still wet. Good marbles that really roll may be painted and inclosed in a bag of mosquito netting to take home. Suggestions for making these bags were made in the chapter on "Sewing."

The improvement of free expression in clay. A little experience with children in the matter of free story-telling in clay quickly shows that the difficulty is not so much a matter of how to use the clay as it is a matter of the mental image of the object being modeled. Children probably have less detailed, less perfect, and less definite mental images of the things they have seen than adults have. This is naturally due to lack of accurate perception, to poor habits of attention, or to confusion between images of memory and images of creative imagination. Therefore improvement in representation of mental images can come about only through the improvement of those images. Trying to model a rabbit, for example, shows the child that he does not quite remember the contour of a rabbit's body. With definite problems in mind, he is ready to see a real rabbit or a good picture of one. Then, with an improved mental image, he goes back to his modeling. Observation, then, should follow rather than precede some experience with expression when some very definite problem is in mind. Sometimes general observation, such as an excursion to a park, stimulates the desire to express; but when specific problems arise, further observation is helpful.¹

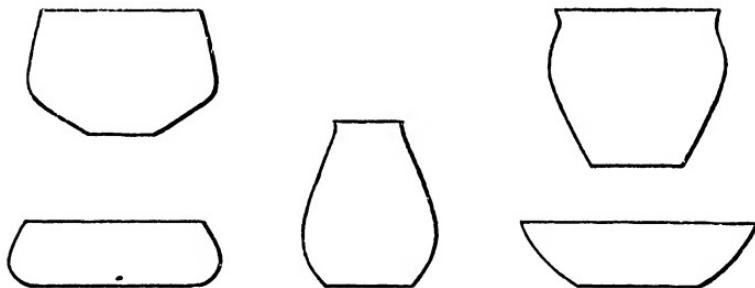
Are little children able to model successfully from an object placed in front of them? We are told that the

¹ Chapter XIV may be consulted for general suggestions for this kind of work.

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younger the child, the less able is he to work directly from a model and that he works rather from whatever mental image he holds at the time. It would seem that models are of most value as a means of comparison and discussion from time to time, but that most young children would probably be hindered by keeping a model before them for close imitation.

Some suggestions for the making of pottery.¹ Most containers made of clay should have walls at least a quarter



SOME SUGGESTED OUTLINES FOR CLAY BOWLS

of an inch thick. When necessary the edges are turned over to make them thicker. The simplest method of making a bowl or vase is by keeping the clay in a smooth chunk and then putting the thumbs into the center and applying pressure. Some of the inside may be removed with a stick if desired. The template or other implements mentioned under "Tools"² are also helpful. Excellent illustrations of Indian pottery are obtainable, and in many communities there are pieces of pottery of good commercial standard that may be brought in for the children to see. The coil method of the Indians should be experimented with. The clay is rolled into a long roll and wound around and around

¹ See Appendix F, VIII.

² See page 68.

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on itself until the shape and size of the jar are realized. Then the whole is welded and smoothed together. A more efficient modern method of using coils is that of making separate rolls and placing one on the other.

Clay cannot be molded over glass, china, or other substance and left to dry on the mold. During evaporation the clay almost always cracks away from the smooth surface. Therefore, if it is desired to have a bowl to hold bulbs or flowers, it is advisable to use a little dish or glass as a pattern for measuring, but not to put it in the clay until the clay outer dish has become hardened. Then the dish or glass can be set inside. If anything is to be partially embedded in clay, it is often best to let the clay dry separately and then glue the two together. For instance, a glass test tube set into a little clay base can be more successfully inserted into the depression after the clay base is dried, because otherwise the edges of clay near the glass will almost always crack.

On the whole, the fingers should make the object as perfect as possible. When the article is nearly finished, the surfaces may begin to be dry and crackly. In that case dip the finger tips in water and smooth out such places. Too much water put on the surface makes an unnecessary slime. Many people use sandpaper extensively to smooth clay after it is dried. It is true that more precision can be effected in that way. However, the dust arising is so disagreeable and so hard on floors and furniture that this should be done outdoors if possible. It is doubtful whether the youngest children need to use it at all. After all, the handmade effect is quite as pleasing as the machinelike effect of sandpapered clay.

The permanency of clay articles. A heavy coat of shellac keeps clay impervious to water for a little while, but this is not permanent. It is impossible to make clay articles

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impervious to moisture excepting by firing and glazing. Most schools have no facilities for firing clay. Only a kiln with heat regulation of a particular kind will do. However, it is possible to make clay fairly hard by baking it as the Indians did, in a pit heated with live coals, or the articles may be put into an iron kettle and sunk into a coal stove or furnace for several hours. Much of the work done in primary grades need not be fired at all.¹

The decoration of clay articles. Most of the beauty of clay articles lies in line and shape rather than in external decoration. This fact should help us to use decoration with great restraint. For many articles all that is needed is a coat of some good enamel or paint. Good enamels may now be bought in small cans at twenty-five cents each. One coat of this is sufficient and gives a high gloss. Water-color paint may be used on clay if a coat of shellac is afterwards put over it. However, this costs more and is less convenient, for shellac is exceedingly expensive and requires alcohol for cleaning the brushes. Good house paint may be used on clay, and is likely to leave a dull surface which is often very pleasing. House paint sometimes leaves an irregular effect also that may or may not be to one's taste. Borders, Indian designs, or colored linings may be painted. The designs usually have to be drawn on, as there is no effective way to transfer them. Sometimes a small stencil may be cut out of thin cardboard and used to draw around but not to paint over. Stick printing may also be used with paint to decorate clay articles.

Designs may be impressed on the soft moist clay and allowed to dry. Sticks for printing may be used thus; also a sharp stick or pencil may be used to incise lines in pat-

¹ Those who wish help in the art of firing and glazing may find it in Bonser and Mossman's "Industrial Arts for Elementary Schools." The Macmillan Company.

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terns. An incised or tooled line often gives finish to the simple edge of a paper weight or other plain object. An effect opposite to that of impression, or pressing something in, is that of low relief, or building something out. Often a suggestion of forms protruding from the mass is very decorative. Seeds and other small objects are often put into wet clay and left there for decoration.

Some elementary clay molds. Sometimes clay is used in this way: First roll out the clay about half an inch thick or less with a rolling-pin. Then sprinkle powdered flint over it to keep it from sticking to the mold. Invert a small saucer or cup or other rather shallow dish, and lay the sheet of clay over it as neatly as possible. Trim and smooth the edges, and when the clay is dry slip it from the mold. Another way to use this method is helpful if a flat square or oblong piece is wanted: Lay a stick on each side of the clay to be rolled. The sticks should be of the thickness desired in the finished article. Roll the clay with the rolling-pin over the sticks which regulate the thickness. If the powdered flint is used to keep the clay from adhering, articles can be cut from the clay as cookies are cut from dough.

Cement has some possibilities for children. Cement and fine sand and water may be mixed and poured into wooden molds made by the children. A tea tile that can really be used is a possibility, and may be made by the use of a four-sided wooden frame on a board for a mold. The cement may be tinted with some of the coloring materials sold for that purpose by school-supply houses. Making mortar for a log house and building the chimney with cobblestones put together with cement, and making little paper weights or bricks, are other possibilities worth experimenting with. The proportions in mixing cement are one part of cement to three parts of sifted sand.

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SOME ARTICLES THAT MAY BE MADE IN CLAY

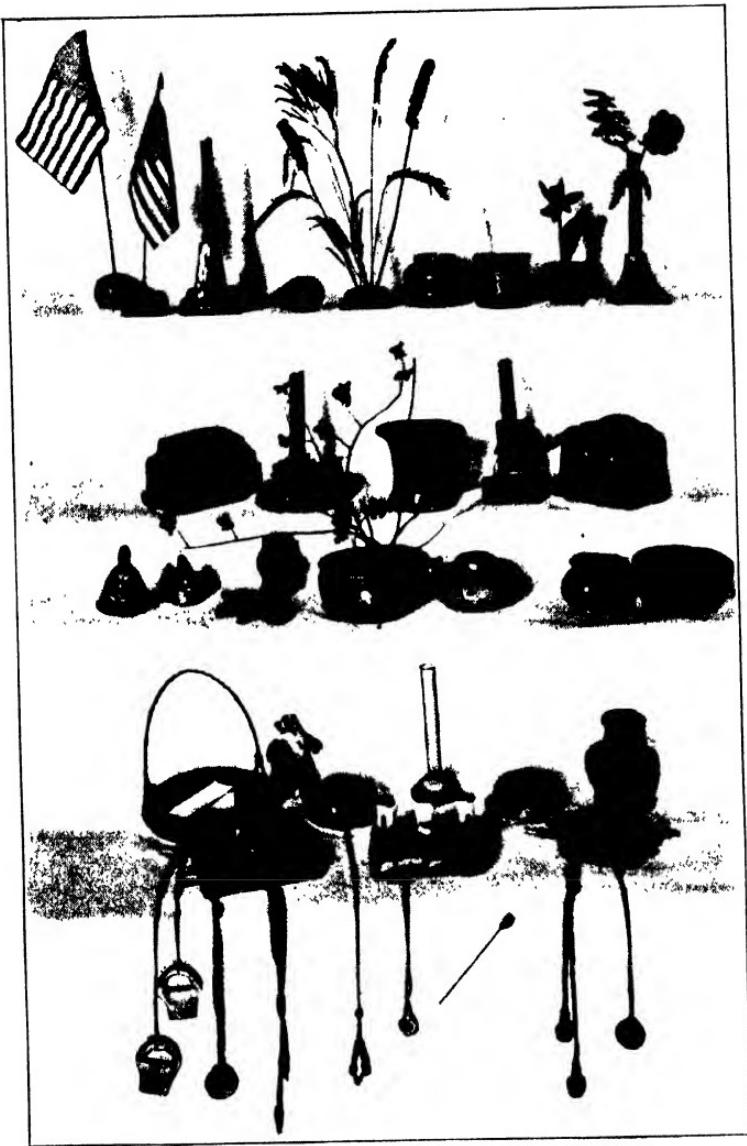
Stocking-darner. A child may make a stocking-darner for mother by modeling a ball of clay over the pronged end of a clothespin. The clay must be well welded to the pin where the handle emerges. The whole may be enameled.

Sewing stand. A little sewing stand is another gift for mother or for some little girl. To make this, model a four-sided base about an inch thick and three by five inches in size. Insert two wooden pegs into the clay, while soft, for spools of thread; make a depression with the end of a thimble for the thimble; and add a small trough to hold pins or needles. There are many variations of this idea.

Pincushion. A pincushion may be made by modeling a small flowerpot attached to a saucer. Stuff a pretty piece of colored silk with cotton and push this little cushion into the pot so that it rounds prettily at the top. It may be filled with pins stuck in to look like flowers growing in the pot.

Trays. Trays for pins, buttons, or other necessities may be made in many ways. A simple one is made by modeling a lump of clay into a smooth ball. Then a hard wooden ball or a door knob is used to make a smooth depression in the center. It is easy to pick things out of this smooth center. Sometimes an ash tray is made for father by equipping the edge of a shallow round tray with lips or mere depressions for resting cigars. Sometimes trays may be made for household purposes in a variety of shapes. The clay may be perforated while wet to allow a reed or raffia handle to be passed through.

Articles for the desk. Among desk appointments for parents or friends we have the paper weights of various designs. Any plain shape, such as an oblong, oval, or hemisphere, is good if neatly made. It should be heavy enough to serve its purpose. Another kind is made by



ARTICLES MADE OF CLAY

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finding a well-shaped hard-pine cone about two inches tall. Model a suitable disk for a base and make a depression for the cone. After the base has been painted and the cone shellacked, the cone may be attached to the base with glue. Weights are often made in other forms, such as animals or fruit. A rabbit crouching low, with ears and tail not too much in detail or in too high relief, makes a good weight for children's use.

A pencil-holder is made by making a substantial oblong base of clay. Into this base are put several lengthwise grooves suitable for holding penholders and pencils. Another type of pencil-holder, for a collection of pencils, is made by modeling a hemisphere or ball and making in it a number of holes, each of which is deep enough to hold a pencil.

A spindle for filing papers is made by sinking into a suitable base either a meat-skewer, a sharpened piece of thin dowel, a long thin nail, or a hatpin.

An inkstand is made by modeling a heavy base of clay and making in it a depression with the ink bottle. Then the bottle is removed. Grooves for pencils may be added in front of the depression.

Flowerpots and vases. There are some articles that may be made to hold flowers. A very simple thing is a Dutch pot of flowers for the tiny child to take home at Easter. A ball of clay is shaped and hollowed slightly. While this crude pot is still soft, there are inserted into it toothpicks or sticks around which the child has wound and pasted some bits of colored tissue paper to imitate flowers. A bit of fringed green paper may be added for foliage. Older children may model real flowerpots and put into them tin dishes or tumblers with bulbs or seeds. Also a carefully made artificial flower, such as a jonquil, may be put into a solid pot at Easter time.

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A dry-bouquet-holder is useful for bittersweet, autumn leaves, or Christmas greens. Model a disk about an inch thick and about three inches in diameter. Perforate this disk with holes large enough to hold twigs or small branches. These bouquet-holders may be put in baskets or jars. On a smaller scale these holders are useful for holding small arrangements of dry bouquets or artificial flowers for party tables.

A bud vase is made by getting at a drug store a test tube and setting it into a small low base of clay that seems suited to the tube in its proportions. Take the tube out while the clay dries, then glue it in.

Bowls and vases in simple shapes may be attempted by children. Some suggestions have already been given for making pottery.¹

Flag-holder. A simple base may also be used for a holder for a single flag. A small flag in a neat base makes a good souvenir to take home on the patriotic holidays, or may serve as a Christmas gift.

Candlesticks. Candlesticks of low proportions are best for little children to make. The candle should be used while the stick is being made in order that the holder may be suitable in shape. A saucer type with a solid handle that has a depression for finger and thumb is good. The larger candles that invite low-lying massive holders without handles are successfully made by children. Children may dip or mold their own candles to go into these sticks. This process is described in a later chapter.²

Incense-burners. These are popular. A simple one is made in two pieces, a little dish and its cover. One or both of these may be perforated, the perforations forming a design. A Japanese mountain may be imitated. The

¹ See page 72.

² See Chapter XV.

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hollow mountain rests loosely on an elliptical base. The incense rises through a hole in the peak of the mountain. A little thatched cottage or a log cabin may be made, the incense coming out of the chimney as smoke. Other variations may be made.

Book-ends. Book-ends must be very heavy to support books. A favorite shape is semicircular, somewhat flattened at the base. Each end is at least an inch and a half thick at the base, and tapers to about three quarters of an inch at the top. The book-ends must be flat and perpendicular where they touch the books. Commercial book-ends are suggestive of shapes that may be imitated by children if the simple designs are chosen. Elephants or rabbits may be modeled in low relief on the outer surface of book-ends. Designs may be incised or painted.

Doll-house furnishings. There are many articles that may be made of clay for doll houses. Bathroom appointments and kitchen sinks may be perforated while wet, then they may be enameled white and fastened to the wall by means of nails put through the perforations. Bowls for imitation flowers, lamp bases, dishes, and vases are among the suggestions for house furnishings.

Suggestions for the use of permanently hardening clays. It has already been suggested that sometimes an idea may be worked out first in plasticine or plasteline and afterwards in a permanently hardening clay. As the latter material is expensive, such articles are of necessity small. Beads and pendants are interesting to make. Toothpicks, hairpins, or thin sticks are used for perforating. A ribbon or cord forms an integral part of the scheme, since a whole string of these beads would be very heavy to wear. The cord may be knotted between well-shaped beads. Pendants may be attached to the ends of the cords or ribbon in several ways: one way is to model the clay right over

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the ribbon; another way is to pass the cord through two holes made in the top of the pendant, thus making a stitch across the top; a third way is to make two holes through the pendant from bottom to top, passing the cord ends through these holes when dry, fastening with knots underneath, and fringing the ends into tassels; a fourth way is to sink into the top of the pendant a small hook made of part of an invisible hairpin. Beads and pendants must have holes large enough for the cords to pass through easily. They may be left to dry on toothpicks or sticks stuck into a potato. This prevents their flattening as they lie. Beads, besides being made for wear, may also be made to ornament sewing bags or workbaskets. A disklike bead may be made for an electric-light pull or a curtain pull.

A bookmark may be made by modeling a small figure over a piece of ribbon.

Tops may be made to ornament gift pencils. Little cubes bearing the four playing-card symbols on the four sides are modeled over pencils and given away as trump-tellers and score-keepers. A small flat disk modeled over a pencil end may have a number painted on it to designate the number of the table in card games.

CHAPTER IV

WOODWORKING

Wood is one of the finest materials for children to work with because with it they can make really usable and durable toys, gifts, and other articles. A wooden chair or wagon is obviously more attractive than a frail imitation cut from paper. Wood is sufficiently crude so that it is easily adapted to the increasing abilities of the child. Children can make things satisfactorily at five years of age, as well as at each successive stage of skill and higher standards. Wood is coarse, bringing into play the larger muscles of the body. Children suffer far less strain in woodworking than in sewing or weaving or paper work. Then, too, children learn many useful everyday skills through their experience with tools. These skills carry over into leisure time and home duties. Moreover, in woodworking there are abundant opportunities for solving problems, for there is scarcely a toy that does not involve mechanical principles to be thought out. Again, the strong desire to own these toys that function in play furnishes a great incentive to originality and perseverance.

There are some objections that are frequently urged against the use of woodworking in teaching little children. Until people have tried it, they invariably think that children hurt themselves with sharp-edged tools. Although there is, of course, a possibility of injury, we can only say that in many years of experience with very young children no child has ever had an injury more serious than a

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pounded finger or a slight skin abrasion such as he receives in ordinary play. One reason for this small amount of injury is the fact that children are willing to learn the proper use and care of tools in order to have the coveted privilege of using them. Some urge that there is too great expense in connection with the use of wood. That good tools are expensive cannot be denied, but they last for years when properly cared for. Many schools are now buying large quantities of paper for primary handwork, although clay and wood are far more economical from the standpoint of what the child gets from them. We must be more willing to spend money on the little children. Many schools are inclined to spend on the upper grades and save on the lower. This is anything but economy. Still another objection often made by superintendents or parents is that the children make too much noise and clutter with woodwork. Such objections make the good of the children secondary in importance to the personal comfort of adults. The best recent thought of educators, hygienists, and psychologists points to the fact that too quiet a primary school may mean that not enough education is taking place or that children are not physically active enough for good health. Another objection, urged by teachers of manual training, is that the children do not learn as great an amount of technique as the manual-training shop requires, and that they are satisfied with too crude results when they come to the age for manual training. In answer to this objection it might be said that the primary teacher should get from the children as high a degree of perfection as is commensurate with the physical powers of children, but that mere technique is never to be sought at the expense of the creative or problem-solving factors. It would be just as logical to forbid the making of dolls' dresses in the primary grades in order that

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the sewing teacher may be satisfied when the children come to her. It seems that a closer study of children would bring about a steady growth in their technique from the kindergarten age until they are ready for manual training.

Observation and experience seem to point to the conclusion that work with wood is so desirable that the apparent difficulties and objections can be overcome successfully if the good of the children is kept in mind.

HOW TO EQUIP FOR WOODWORKING

Although low manual-training benches may be purchased for primary schools, most schools have to resort to improvised benches. Any old, heavy table may be used which is of the right height for children standing. A heavy plank may be laid across two boxes or across two low sawhorses constructed by a carpenter. These benches may be put away when not in use, thus conserving room space.

If there is a very limited school budget, tools will have to be selected with great care. Probably one saw, four hammers, and some nails may form the nucleus, to which other tools may be added as opportunity permits. Sometimes children bring tools from home if good care is guaranteed. Manual-training departments often lend their tools if assured that they will be well cared for.

It should be borne in mind that it is the poorest economy to buy steel tools of anything but good quality. The tool may not be highly finished or trimmed, but it must be of good material. One may buy light-weight or small-sized tools but not poor tools. If a grown-up needs a good tool to get a good result, how much more does the unskilled child need it! The cheap tools in toy tool

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chests are often a hindrance to children and discourage real work. Fewer and better tools are more worth buying. It is the exceptional school that has tools enough to go around, but one can easily equip for woodworking by beginning on this small scale. Planes, chisels, and coping-saws are not used before the second grade, and often not until the third. Often one brace and bit, one chisel, one smoothing-plane, and one block plane are enough for an entire room of these older groups to share, but hammers and saws, coping-saw frames, and clamps are bought in as large numbers as can be afforded.

MATERIALS

It should be possible to find enough old wooden crates, boxes, lumber scraps, and odds and ends to keep children in wood without much expense. However, if possible, it is well to purchase some wood, because scrap lumber is rougher than it used to be. When we buy wood, we buy soft basswood or pine in thicknesses of three eighths of an inch to an inch. Bought by linear measure, it may be ripped into strips of serviceable widths for table legs, handles, and other uses. For small articles to be made with a coping-saw, use thin basswood not over three eighths of an inch thick; but for heavier parts, such as cradle ends, use half-inch wood. If it is impossible to have ripping done locally, one can often find in lumber yards narrow strips that are sold for latticework and window-framing. Usually the thin basswood is not kept in stock at lumber yards because it warps so quickly, but it may be ordered. It is well for teachers to investigate local sources for obtaining wood, such as furniture and cabinet factories, where small scraps of wood are sometimes given away.

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Dowels are very useful in primary woodwork because they are so easily sunk into wood to serve as uprights. Dowels come in yard lengths, and in diameters ranging from three sixteenths of an inch to an inch. They may be purchased by the dozen or by the piece from lumber concerns, furniture factories, and school-supply houses. Another useful material is the enlarged kindergarten stick. It comes in twelve-inch lengths, a hundred in a box, colored or plain. Often a small square stick is wanted, and it is difficult to cut ordinary lumber so small. Enlarged sticks are to be had from school-supply companies that handle the traditional kindergarten material.

Wooden wheels are very useful in the making of vehicles, and they also make good bases for some things, such as a ringtoss game, for example. If there is a band saw in the community these circles can be cut out at small cost, but most teachers have to get these wheels cut at a furniture factory. They usually cost about five cents apiece for most of the smaller sizes. In diameters of from three to seven inches they serve many needs. They may be of half-inch bass or pine. A wheel-cutter can be bought from certain tool companies at a reasonable price. It is to be attached to any good brace, and may be adjusted to make wheels of different diameters. Every wheel cut with this cutter has a hole bored in the center. The operation of the device requires strength and some skill, but it is very satisfactory. If the school purchases one, some older boy may be given the task of cutting wheels and, even with a small charge for this labor, the cutter will soon pay for itself. There are some substitutes for wooden wheels, such as tin covers, thick cardboard covers, and similar chance finds. Wooden button molds from the dry-goods store make good wheels for tiny carts or animal stands.

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Nails, wire, screws, hooks, and many other forms of hardware are sometimes needed to finish articles or to put them together. It is often wise to search the ten-cent stores for some of these things. Usually the cost of these sundries is negligible.

Odds and ends may be very helpful in woodwork. Film rolls, spools, parts of broken furniture, old berry boxes and fruit boxes, and such miscellaneous articles are serviceable. Cigar boxes are useful, but offer the problem of removing the paper. This is best done by dabbing with a cloth saturated with warm water and vinegar.

TOOLS FOR MEASURING

Rulers. For ordinary measuring, children who are old enough use rulers. The child who is too young to read the ruler uses strips of paper. After he has placed one table leg in place, he will measure by means of a piece of paper to get the other three legs to correspond.

Try-square. A child of any age can learn to use a try-square. Metal try-squares about eight inches long are suitable for this. If a child wishes to cut across a board, he places the square on the mark and presses close to the straightest edge of the board. Then he draws a line along the blade of the square and saws along this line.

Miter box. When a narrow strip of wood needs either to be sawed at right angles or to be mitered, a homemade miter box may be used. A carpenter or an older boy can make one. Fairly hard wood is desirable. Cut a board about an inch thick, four inches wide, and eighteen inches long. Nail to the long edges two sides three inches high. With a saw make an accurate crosscut at right angles through these sides down to the floor of the box. Make another cut in the box at an angle of forty-five degrees

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to form a true miter. When used, the box is clamped to a table or held in place. The strip of wood is laid in the box, and any saw is used to cut down through the wood at the ready-cut groove.

HOLDING DEVICES

In one sense the miter box is a holding device.

Clamp. The carriage clamp is a very good device for holding wood in place. This clamp may be had in several sizes, differing with the size of the opening. It is fastened to the table or bench by adjusting the screw underneath. A piece of waste wood may protect the material from being marred by the clamp.

Vise. The woodworking vise is found on manual-training benches and may be added to any heavy table at some cost. On the whole, the expense of this device forbids its purchase by many schools. When workrooms are being fitted up for several grades to use, it is often possible to put in a vise.

When children do their woodworking on old tables or planks, it is often possible to drive into the table or bench some tacks against which a child may push while planing. The tacks should be lower than the top of the wood, so that the plane can slide over them. A thin strip of wood may be nailed to the table as a bench stop. These devices are crude imitations of the bench stop found on manual-training benches.

CUTTING TOOLS

Saws. All saws have either crosscut teeth or ripping teeth, depending upon whether they are meant to saw against or with the grain of the wood. When buying saws for ordinary sawing, one should consider this fact. How-

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ever, if one wishes to buy only one saw, a crosscut saw will saw both ways. It has teeth that seem to turn alternately out and in. The ripsaw, on the contrary, has straight, simple teeth. A saw for all purposes is the handsaw in medium size and weight.

Another kind of saw that is good for the sawing done by children is the backsaw, which has a steel rib along its back. It is short and does not taper as does the handsaw, so there is little vibration. This saw was designed to use with a miter box. Its construction forbids its use in sawing wide boards; therefore it would not be wise to purchase this kind of saw alone.

The keyhole saw has a narrow, tapering blade that is very small at the end. It is used to get into small places where the ordinary saw could not be used. To saw out the window of a doll house, bore a hole in one corner, insert the keyhole saw, and saw out the opening. It may be used for fine sawing on small articles as well.

Coping-saws are made to saw around curves and delicate outlines. There are two kinds of frames and blades. One frame is small and has blades about a sixteenth of an inch wide. This is the coping-saw most commonly used. There is a heavier coping-saw, used by carpenters, that has a wooden handle and a heavier steel frame than the small saw. Although the small frames and blades are cheaper, the small blades break far more easily. Great saving of children's energy results from the use of the larger saw, and it enables children to learn the use of coping-saws earlier, say in late first grade or second grade. It would be sensible to get at least some of these larger saws, rather than many of the small variety.

How to use the ordinary saws. The wood to be sawed should be firmly held. The carriage clamp is very useful for the younger children, but older children use their left

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hands or their knees to hold wood in place. In any case children should saw at or below waist level, preferably below.

Only the right hand should work the saw, unless the child is left-handed. Whether the other hand is needed for holding or not, it should rather brace the body than assist the sawing. To use both hands on the saw throws the body out of position.

Children should mark a crosscut line with a try-square before sawing across wood. They should start the saw by dropping it in a vertical position below the board, and then quickly pull it backward on the mark, making a groove to start the sawing. Children should not attempt a long stroke at first, but should saw as rhythmically and easily as possible. The saw should be held in a position halfway between the vertical and the horizontal. When held thus, a tiny groove always precedes the actual cut.

Children will learn to feel the blade cutting, but most of them will work too hard while sawing. Although one may show children these ways of making sawing effective, the fact remains that each child will have to learn to saw by sawing.

How to use the coping-saw. Insert the small blades by putting them into the grooves in the frame so that the teeth run downward and outward. The small frames may be pulled out or pushed together to make the blade fit. The blades for the larger saw are put in by unscrewing the handle, inserting the blade, and screwing the handle back, at the same time firmly holding the little lever near the handle.

Clamp the wood to the table, allowing only a small portion of the wood to extend over the edge of the table so that unnecessary vibration will be avoided. Waste wood will protect the wood from being marred by the clamp. Change the position of the wood frequently.

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Saw with the frame in a vertical position, holding the handle under the table. Do not twist the saw suddenly or allow it to get too hot, if you wish to keep breakage of blades at a minimum. Saw so that the cut edges will be straight, or at right angles to the surface of the piece. If the saw gets in a tight place from which it seems difficult to remove it, another saw may be used to saw up to the place.

Brace and bit. The brace is the frame that holds the bits of various sizes for boring holes. Bits and drills may be had in sizes making holes from a tiny one up to one over an inch in diameter. The bit is inserted into the brace after the latter has been unscrewed. Then it is screwed back until it is tight. Always remove the bit when not in use, to protect its delicate sharp point.

The brace and bit may be held horizontally, holding the ball against the abdomen. If the brace is held vertically, pressure is applied from above while the person leans upon the ball. Small children should stand on chairs if the wood is held in place on the table. The wood to be bored must be held in a vise or a clamp. If the hole is not to tear roughly at the back, a piece of waste wood must be clamped at the back to protect it. The brace and bit must be held at right angles to the wood, so that the hole will be straight. When boring a hole in which to sink a dowel, be sure to get the dowel first and then find a bit to match it in diameter.

Chisel. This is a useful tool, although it is not so necessary as other tools. It is used to chip away wood in places where it would be impossible to use larger tools. For instance, if a square pole were to be sunk into a base, the outline of the square would first be cut by pressure on the chisel, and then the chisel would be useful in chipping away the wood within the outline to a desired depth.

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SMOOTHING TOOLS

Planes. A smoothing-plane of medium size may be used by children in the second and third grades. This plane is for smoothing wood with the grain. A small block plane is very useful for smoothing small surfaces either way of the grain. The plane is the best tool for smoothing wood, and should be used as soon as children are able. Great care must be exercised that the parts of the plane are not lost. Teachers had better adjust the blade themselves for the younger children until the latter are able to do it well. It is well to plane a piece of wood before it is cut into parts, since it is impossible to plane small pieces successfully.

Wood to be planed must either be held in a vise or be pushed against a tack driven into the bench so that the tack is lower than the top of the wood, or against a strip of thin wood tacked to a bench for that purpose. The plane should be used in this way: with the blade adjusted so that it takes off only a little wood at a time, take a stroke, lifting the plane slightly as the end of the stroke is reached. In the case of the block plane, hold it in an oblique position, and take the strokes only partly across. Then turn the wood around and do the same. This keeps the plane from splitting off the wood at the end of a stroke.

Wood file. This tool is to smooth crosscut edges only. Hold the wood in a clamp or vise. Hold the file in an oblique position and take strokes only partly across. Turn the wood and repeat. This keeps the file from tearing the edges of the wood. Files may be selected from grades assorted as to roughness or fineness, and there are files of several shapes to choose from. Use wood files on wood only. Iron files may be purchased for use on metal.

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Sandpaper. This is used to beautify wood after all other possible smoothing has been done. Since the younger children do not use planes, one allows them a freer use of sandpaper for smoothing. The sandpaper which comes in packages of a dozen sheets about five inches square, and assorted from coarse to fine, is most convenient.

To use sandpaper, wrap a piece around a small block of wood. Rub with the grain only ; otherwise every scratch will show when the article is stained. Sandpaper may be used over again until well worn.

FINISHING TOOLS

Hammer. A claw hammer of good material but of medium size and weight is suitable for children to use. Children should learn to grasp the hammer with only one hand, as far down the handle as possible ; they have a tendency to hold the hammer too near the head, which cramps the stroke. With the hammer held at least halfway down the handle, the child should be encouraged to try a free-arm stroke, making use of the muscles of the upper arm and shoulder. Whether he hits the nail each time or not is less important than learning this arm stroke. The child should always stand to hammer until he is well developed muscularly.

It is often better to start nails before driving. For example, start nails in all four corners of a table top, then set the top on the legs and finish driving. Children should learn to choose nails of right length and suitable thickness. They may learn to put at least two nails in each joint, such as the place where a table leg is attached. They should learn to draw a nail easily by putting a small block under the head of the hammer. Tin gem pans are good for holding nails of different sizes. As a rule it is

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hard to keep nailheads from showing, but an older child may sink a head with a nail set and fill the hole with putty.

Furniture glue. This may be had in small cans. It is very heavy, and is needed in repairing breakage, in fastening pieces of wood, and in sinking dowels. Clamps are useful for holding mended places while drying. Apply the glue with a stick. If too thick, set the can in hot water. Vinegar cuts glue if it is necessary to remove it from clothing.

Miscellaneous tools. If it is possible to have them, there are some miscellaneous tools that are very handy. A screw driver, an awl, a whittling knife or two, a wire-cutter, and some pliers, all do good service. With the exception of the knives and wire-cutter, the articles mentioned may be of the cheaper variety such as may be had at a ten-cent store.

THE PAINTING OF WOOD ARTICLES

Kinds of paint. Many things are much improved by painting. Cheap paint may be purchased in the ten-cent stores, and better grades of house paint at the paint stores. Sometimes the better paint is, after all, more economical because of its greater covering capacity. Besides the regular house paint, there are now on the market several brands of enamel. This covers exceedingly well, and it comes in small enough quantities to obviate waste from drying out. A twenty-five-cent can is a satisfactory size. It has a higher gloss than house paint. Bird houses, toys, and many other articles are best treated with paints if color is desired.

Stain is another material for preserving wood. It is practically transparent, and the wood to be stained must therefore be free from blemish. It comes in colors of natural woods, such as oak and mahogany. Furniture and some other articles may be stained.

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Shellac is a clear, transparent fluid that gives a high gloss. It is best used when the wood needs only to be preserved rather than covered or colored. It adds a pale yellow color. We often shellac over a smooth box on which pictures have been pasted, putting the shellac over both wood and pictures. Shellac is very expensive and its use is limited. A clear varnish is a substitute.

Thinning of paints. House paints, enamels, and stains may all be thinned with turpentine. When that is very expensive a cheaper turpentine mixture may be substituted by any paint dealer. Shellac is never treated with turpentine, but always with alcohol, and shellac brushes should be cleaned with alcohol as well.

Care of paint cans. To open a friction-top can of paint, use a patent can-opener such as paint manufacturers give away. A screw driver will do also. In a new can of paint, especially in the case of white paint, the pigment collects heavily at the bottom, while the oil floats on top. Pour the oil off into a dish, then whip up the pigment until it is smooth and thin, then add the oil a little at a time. Paint must always be well stirred before using, but stain or shellac needs only to be well shaken. Clean sticks, and not such things as knives or rulers or pencils, should be used for stirring. When putting a can of paint away, add a little turpentine so that the paint will not get dry. Always cover paint cans well.

Use of the brush. The purpose of paint is to fill in the pores of the wood to preserve it as well as to beautify it. The brush should be held as a spoon or pencil is held. Dip only the tip of the brush into the paint, and twist slightly as the brush is lifted from the can, to keep the paint from dripping. The child should be taught to work the paint thoroughly into the wood, with the grain. Cross-cut surfaces should be dabbed vigorously to fill them. A

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child should be critical of his painting, looking for "white spots," and covering a small area at a time. When paint is used there should never be puddles of paint left on the surface, for all paint should be worked well into the wood. When stain is used the surplus may be rubbed off with a cloth. No brush should ever be left, even temporarily, in a can of paint. It should be freed of surplus paint and laid on a paper.

Cleaning of paintbrushes. If the brush is to be put away for a few hours or overnight, it may be left in a jar of water. The water merely keeps out the air. When brushes are ready to be cleaned to be put away, soak them for a few days in kerosene or gasoline, or in a solution of commercial paint-remover. Later the brushes are washed in warm water and soap flakes or washing powder. Shellac brushes are cleaned only in alcohol. Any glass or metal receptacle that has held paint may be cleaned of hardened paint increment by soaking in a solution of lye and water in an earthen jar.

Children should wear aprons while painting. Floor and tables may be protected with newspapers, strips of oil-cloth, or old canvas. A small cloth saturated with kerosene will loosen the paint on the hands before water and soap are used. Clear turpentine will remove or loosen paint spots on clothing.

Decoration in paint. As a rule, animal stands or other stands or bases to hold figures should be painted black or some neutral color to allow the animal or figure to stand out in color. Features should be outlined in black so that they will stand out more effectively. Stick prints may be used to decorate painted articles. Outlined or silhouetted figures are also attractive. Sometimes small colored pictures are pasted on the painted wood and then shellac is put over the pictures.

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HABITS TO BE TAUGHT IN WOODWORKING SITUATIONS

Children should develop a pride in the intelligent use of tools and a desire to keep tools in good order. They should protect both the tools and the school furniture from injury, and should not run about with tools or make passes at other children.

They should always return tools to their proper places, and tools should have suitable places to lie in or to hang in. When they are put away for the summer they must be oiled and wrapped to prevent rusting.

There should be economy in the use of materials. Children may learn that a plan is always necessary for the use of any material, although changing one's mind may still be allowable.

The use of tools creates many situations that are stimuli to social behavior. Coöperation in sharing or in using a tool, appreciation of the difficulties or triumphs of other children, and a desire to be generous when difficulties or setbacks occur, all have value as character-training.

Conversation is neither so easily possible nor so profitable in woodworking as in other handwork situations. Children should not shout above the noise of tools unless it is necessary.

SOME PROCEDURES COMMONLY USED

There are some procedures so often used in woodworking that it seems wise to describe them here.

To sink a dowel. Find a bit the size of the dowel. Bore a hole into the wood that is to hold the dowel. This hole must be deep, but must not go entirely through the wood. Now drop some glue into the hole, and set the dowel into it so that it will dry in the desired position.

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To put wheels on vehicles. Usually, in making wagons and carts we make use of the axle, which is a stick fastened to the under side of the wagon box. In making a two-wheeled cart a young child nails his axle of square strip to the under side of the box and attaches each wheel to it by a nail. A hole should be bored through the center of each wheel, so that it will go around smoothly, and the nail put through this hole into the end of the axle. A small tin cap is often needed to keep the nailhead from passing through the hole.

Another method is this: Cut a square stick for an axle a little longer than the width of the wagon. Bore a hole about an inch deep into each end of the axle, and insert into these holes pieces of thin dowel and glue them in. Then bore holes in the centers of the wheels a bit larger than the diameter of the dowel. Slip the wheels over the dowel pegs. Then the wheels have to be kept on either by cutting the dowels close to the wheels and nailing on tin caps or by putting thin nails through the dowels near the wheels.

Another variation of the square axle is merely to whittle the ends of the axle round, and then proceed as in the foregoing directions.

A round, or dowel, axle is very difficult to fasten to the box; but instead of being nailed to the under side of the box, the round axle may be passed through little brackets made by boring holes into blocks of wood. These brackets are fastened underneath, near the edges of the box, and the procedure continues as before.

To find the center of a wheel. Children may draw around the wheel upon paper. After cutting out this pattern, they may fold the paper circle into halves and then again into quarters. On opening this fold they will find the center where the two creases cross.

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To put on a handle. A tongue or handle may be attached to a wagon by means of a small hinge or strap of leather or tin. This may be attached either to the axle or to the front of the wagon box.

To bevel an edge. Sometimes, when a square base or standard looks unfinished, we bevel the edges. This means that the upper edges are taken off with a plane and file.

ARTICLES THAT CHILDREN MAY MAKE WITH ORDINARY TOOLS

Children may make many articles that are needed in the schoolroom, such as bulletin boards, trays for materials or lunch, signs, shelves, orange-crate cupboards, and crude tables. These need not be described further. The following list is merely suggestive. The articles that involve the use of ordinary tools are named first. Following those are the problems that require the use of the coping-saw. It may again be urged that all the problems are to be worked out experimentally with the children. The rather specific directions here given are meant to aid the teacher by bringing to her mind some of the possible solutions of the problems involved in making each article.

THINGS FOR BIRDS

Bird houses. A house must be made to suit the habits of a particular bird. Information may be found in any bird book. Holes for entering should be nearer the top of the house than the bottom. The wren requires a hole about the size of a quarter. There are several types of houses, among them the perfectly square house nailed to a brace, the house that has a roof slanting from the back to the front, and the one with a gabled roof. Whatever the style,

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the idea may first be worked out in paper before actual construction begins. Roofs that are hinged allow the house to be aired and cleaned. Most bird houses should be painted in protective coloring in order to attract birds.

Bird pavilion. Robins will nest in this pavilion in the summer, and other birds will eat out of it in the winter. It is made of a shallow cigar box. The cover is removed and raised up on eight-inch corner posts cut from strips of wood half an inch square. The corner posts are nailed to the floor and four corners of the box, and the cover is put on top for a roof. A brace which can be nailed to the tree is fastened to the back of the house and to the roof, giving added support also.

Birds' lunch counter. This may be made of a board about twelve by six inches, and half an inch thick, with a narrow railing all around the four sides. A brace is needed by which to nail it to a tree or fence. A more elaborate cafeteria is made like this and divided by low partitions into compartments which may hold different kinds of food. A companion piece might be a similar rack for holding a dish of water.

Suet-feeder. This is made of half-inch board six by nine inches. Attach a railing two inches high to one short end and to the adjoining sides for two-thirds of their length. Over the top of this three-sided inclosure nail a piece of wide-meshed hardware cloth, using staples to fasten it down. The feeder is hung with the open end up like a mail box. A piece of suet is slipped into it, which the birds peck at through the holes of the mesh.

Spike feeder. Use a board six by eight inches. With two pieces of wood, one four by five inches, the other four and a half by five inches, make a gable roof, and nail it against the surface of the large board so that the point of the roof touches the top center of the large board. Thus

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this little gable extends forward at right angles to the supporting back. Below this as a shelter drive into the large board a long thin spike, or sink into it a thin dowel



BIRD-FEEDERS

1, spike feeder ; 2, tin-can self-feeder ; 3, robin pavilion ; 4, suet-feeder made with hardware cloth ; 5, suet-feeder made with a soap-shaker ; 6, simple lunch counter ; 7, bird cafeteria ; 8, self-feeder ; 9, simple feeder

sharpened on the outer end. The spike must be driven through from the back. On this spike or dowel a bone or crust or piece of suet may be impaled in winter. In regions where strong-billed birds are invited to feed, an ear of corn may be put over the spike.

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Self-feeder. This is a bit more difficult, but makes a good problem. Cut a board six by ten inches for the back. Attach two sides, three inches in width, to the long sides of the board. Inclose one short end for the bottom. You now have a three-sided box. Now cut the top of the box off so that it slants toward the front, and add a cover broad enough to shed rain from the box. This cover may be hinged at the back. Lastly cut another board six inches wide and a very little shorter than the front height of the tall box. Fit this piece into the front of the box in a slanting position so that the opening of the feeder is as wide as possible at the top and only just wide enough below to allow seeds to come down as needed by the birds while they feed. Then the whole feeder is mounted on a brace on the back, which provides a place for nailing it to a tree.

Another self-feeder is made as follows: Nail a shallow tin cover, such as one taken from a gallon sirup can, to a wooden circle or square, half an inch or more in thickness and somewhat larger than the tin cover. Invert a baking-powder can over the sirup-can cover, and rest its edge in little grooves cut into three tiny pieces of wood nailed to the cover. These small pieces of wood should give just enough height to the can to allow seeds to come down out of it as needed. The tin cover keeps the seeds from falling off. Fasten a brace against the base for hanging to a tree.

Tiny children often nail rather deep can covers to a wooden base for holding food for winter birds, and again they drive long brads into a wooden board, to which pieces of crust or suet can be attached.

Bath. A bird bath for the school yard may be made by a group of children. The central support may be a piece of birch sapling of any desired height, procured in the

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woods and sunk into the ground. Build upon this a platform about twenty-four inches square, with a railing all around it of sapling or narrow boards trimmed with vertical strips of bark or twigs. The railing will be about three inches deep. Fit into this a shallow pan, earthen flowerpot saucer, chopping bowl, or other receptacle for the water. The spaces left over may be filled with moss or pebbles.

TOYS

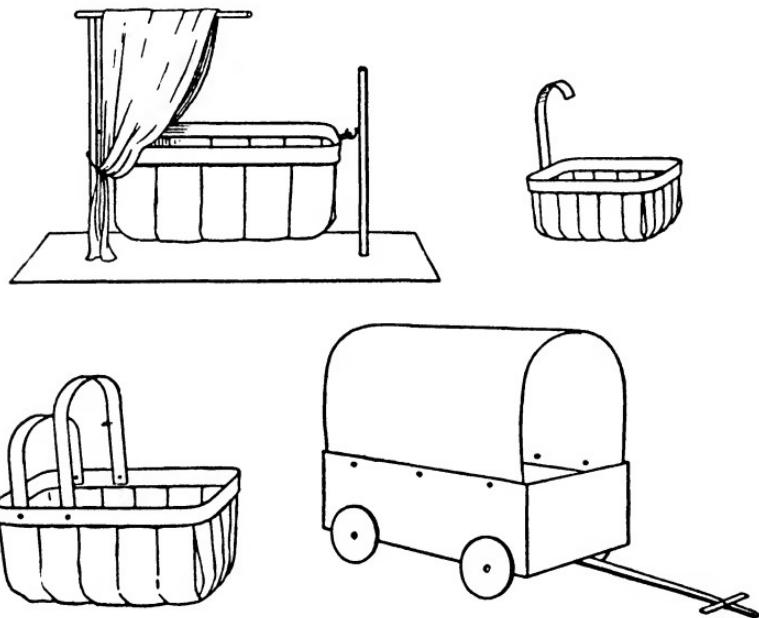
Bassinets. These are made for dolls to sleep in or to be rocked in. A small vegetable basket for a tiny doll, a grape basket or market basket for larger dolls, or even a small clothesbasket for a better bassinet, are favorite materials. Find a piece of wood heavy enough and wide enough to form a base to go under the basket lengthwise, extending some inches on either end. Sink into this base, at each end, an upright dowel of suitable thickness. The two dowels should be far enough apart to allow the basket to swing comfortably between them. The basket may be suspended from these uprights by loops of tape hung over hooks or nails. The basket should be hung rather low in the frame. Paint the basket before dressing the inside with cloth. Suggestions for dressing were made in the chapter on "Sewing."¹ Sometimes bassinets are mounted on wheels attached to a framework underneath the basket.

The canopy for a bassinet may be made in several ways. Leave one basket handle on if its shape is suitable. Remove the other and nail it in such a place that it forms a second arch halfway between the end of the basket and the center. This will enable cloth to be drawn over this frame in an arched fashion. Sometimes several thicknesses

¹ See page 44.

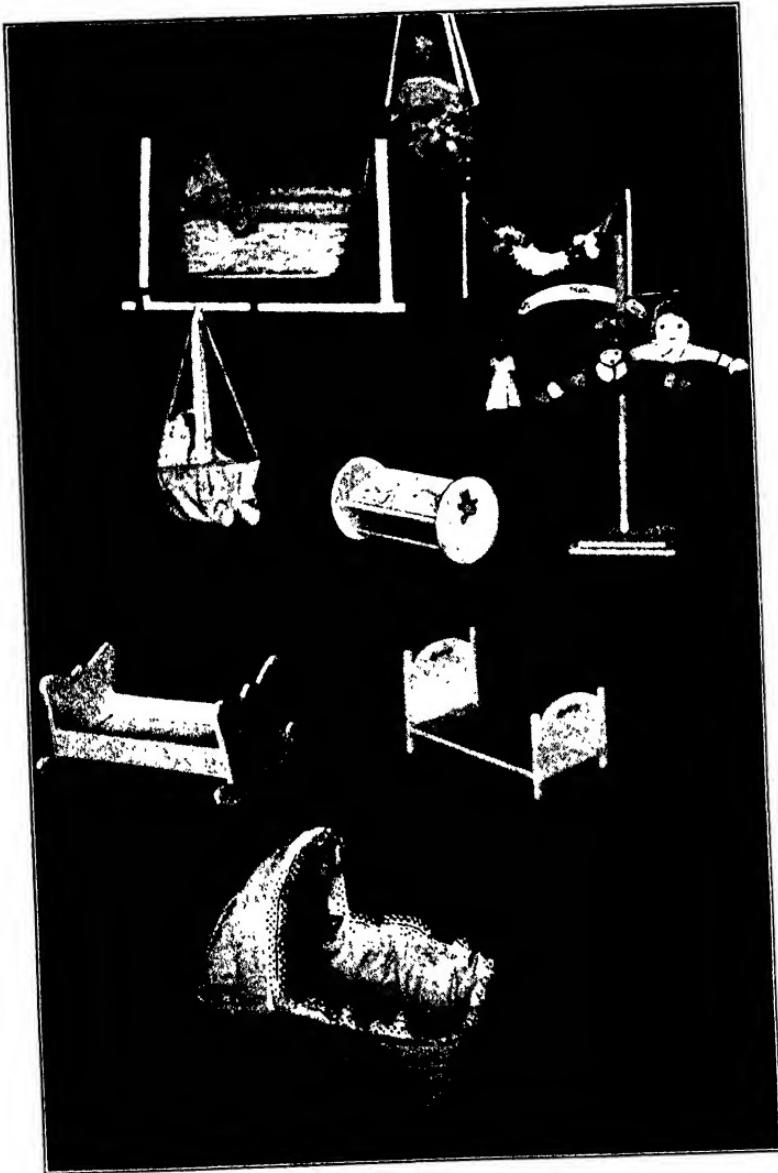
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of flat reed may be used to form the arches for the canopy. Sometimes, too, a framework for the canopy is made simply by nailing to the top of the upright support near the head end of the basket a short strip of wood at right angles to the support and parallel with the lengthwise edges



SOME TYPES OF CANOPIES FOR BASSINETS

of the basket. The cloth is laid across this piece of wood and draped down to the sides. Another kind of canopy is made in this way : Find a piece of basket handle or barrel hoop or heavy wire, and make one central support for the canopy by attaching one end to the center top edge of the head end of the bassinet and allowing the support to go upward and then parallel with the length of the basket for a short distance. Then break it off. The cloth is laid across this central curved frame so that



BASSINETS, CRADLES, SWINGS, AND OTHER THINGS FOR DOLLS

EDUCATION THROUGH MANUAL ACTIVITIES

it falls prettily down on both sides tentwise. Still another type of canopy is made by fastening a part of a round oatmeal box to the head end and letting it curve over the top of the basket toward the rear. The ends of the cardboard are tucked into the rims of the basket edge and tacked. This cardboard canopy may be covered with cloth.¹

Doll carriage. This may be made of a grape basket mounted on two or four wheels. Suggestions have been made elsewhere² for putting on wheels. The basket carriage has a canopy top similar to those described under "Bassinets"; it has suitable cushions and lining, and a tongue is added to use in wheeling. The outside of the basket, and the wheels, may be painted. If the basket is not very smooth, the whole of it, both outside and inside, may be covered with cloth.

A simple cradle. Find a shallow cigar box and two wooden circles whose diameter is a little longer than the width of the box. The box is nailed in place between the two circles, which serve the cradle as headboard and foot-board and also as rockers. The circles may be made large enough so that the edges of the box do not extend quite to the edges of the circles. If no box is available, the body of the cradle may be constructed. In making this cradle a child will have to measure carefully to get the two ends evenly placed.

Doll swing. A tall swing may be made by sinking two dowels into a base strong enough to give the structure solidity. A dowel or flat stick is attached across the tops of the uprights, and a cord swing with a small wooden seat is suspended on the crosspiece so that it hangs down in the frame. Another kind of swing is more like a porch swing. The seat, for several dolls, may be constructed

¹ See page 104.

² See page 98.

WOODWORKING

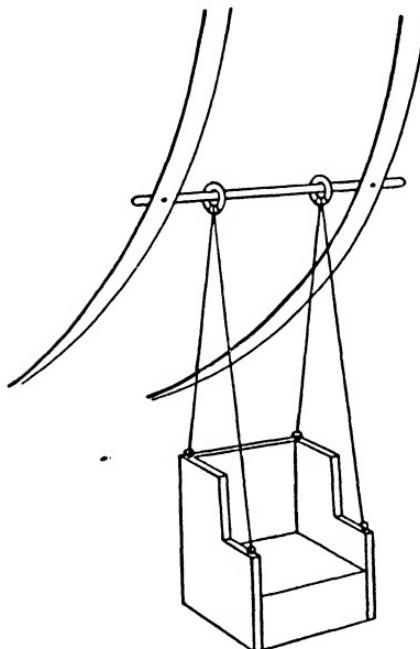
of wood, of a wooden or tin box, or of a cardboard box upholstered in cloth. This seat may be hung by little chains or pretty cords. The frame may have a length of board going under the whole swing and extending well out on both ends. Into this as a base the two dowels may be sunk for uprights. The crosspiece may be either a dowel or a square stick. When a dowel is used, it will need to be flattened where it touches the uprights in order that there may be enough contact for nailing. Sometimes a frame is made of strips of wood that form a triangular framework at each end. This style may have an awning overhead. However, this type is much more difficult to stabilize.

Merry-go-round. This is sometimes made for a play circus. One way is to find a rather heavy block of wood and bore a hole large enough to allow a heavy dowel to rotate easily in it. On this dowel as a central support build a set of crossed arms with seats hanging from them. If two sticks are crossed in the center, nailed together, and a hole bored into the crossing into which the dowel is fitted tightly, then the whole may be set into the block as a socket. A canopy top may be added if desired.

Ferris wheel. This is another circus toy. It may be made with the help of the teacher. Two small wooden barrel hoops are needed. Consider first the problem of the seats, which must remain in an upright position as the wheel turns. If there are to be eight seats for passengers, make eight little seats of cardboard or small boxes, about two inches wide and an inch and a half deep. Each seat may have cords attached to the sides, the cords on both sides passing finally into two brass rings about half an inch in diameter or more. Now connect the two barrel hoops with each other in parallel position by means of eight thin

EDUCATION THROUGH MANUAL ACTIVITIES

dowels about six inches long, nailing them at equal distances around the circumferences. Before nailing each dowel to the second hoop, slip over it the brass rings holding a carriage seat. The seat hangs free as the wheel turns.



SHOWING HOW TO ATTACH THE SEAT
OF A FERRIS WHEEL

Now the support for the Ferris wheel must be thought of. One way to make this is to find a solid piece of wood, perhaps eight by eight inches and at least an inch thick. To the center of one edge of this base nail an upright high enough to support the axis of the wheel in such position that, as it turns, the dowels and attached seats will clear the base. To make the axis of the wheel, nail two pieces across each hoop and insert a bolt through holes bored at the centers of the hoops where these pieces cross.

The bolt should also fasten the wheel to the upright of the frame, through a hole at the top. These bolts are obtained at hardware stores.

When the wheel has been properly constructed, the little seats fall easily between the two hoops and hang in proper position no matter how the wheel turns.

Running-wheels. This toy is made by attaching a wooden wheel about six inches in diameter to a stick about thirty

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inches long, so that it will revolve as it is pushed along the floor. A simple way to make one is this: Bore a small hole through the center of the wheel, put a long nail through it, using a cap of tin to keep the head of the nail from going through. Allow this nail to pass through the end of the stick and clinch it on the other side. The nail must fit loosely enough to allow the wheel free play, but not so loosely as to make it roll unevenly.

A way for a more advanced child to make a running-wheel is to make it with a better joint at the wheel. Besides the handle stick, cut another stick about a foot long. Fasten the wooden wheel between these two sticks by passing a two-inch piece of thin dowel through a hole bored in the wheel. Then sink the small piece of dowel at both ends into the two sticks and glue it in. The wheel should go around on the dowel, but the dowel should be tight in the two sticks. Now insert another two-inch piece of dowel between the other end of the twelve-inch stick and the nearest place on the long stick. This is merely a brace. If the wheel goes too much from side to side, put in a small tack on either side to hold it in place.

Sometimes children attach a cigar box to the handle near the top to hold something as they run with the wheel.

Wheelbarrow. Any wooden box, such as those used for starch or cocoa, will serve as a foundation for this toy. Remove one short end of the box entirely, and slant the sides of the box toward the open end by cutting off the corners. Any real wheelbarrow will suggest this. Then lay two wooden strips of sufficient strength across the bottom of the inverted box so that two ends converge at the front to hold the wheel and the other ends diverge at the back for handles. Make a joint for the wheel as described under "Running-wheels." Nail the long pieces of wood in place underneath the box of the wheelbarrow.

EDUCATION THROUGH MANUAL ACTIVITIES

Two legs for the barrow to rest on as it stands are fastened to the rear corners; these are strongest when they overlap the outside of the box for several inches, instead of being set under the box.

Wagons. Any box will serve as a foundation for a wagon. Two or four wheels may be put on, as described previously.¹ The way to add a tongue has been described also.² Various types of wagons and carts can be adapted from the simple type, and observation of real vehicles gives children many suggestions for durable construction.

Automobile truck. Find one shallow cigar box for the body of the truck, and cut down another box to put up against the end of the body to serve as the driver's cab. Mount the whole on a board long enough to extend a little beyond the body behind, and far enough out in front to be shaped to resemble the radiator of a car. Wheels are attached in the usual way, and windows, steering-gear, or other features may be added as desired.

Boats. A simple boat is made of a piece of half-inch wood about four inches wide and ten inches long. Children may fold and cut a paper pattern to get a pointed end for the boat. When the end has been pointed, nail an inch-square strip of wood along the center, lengthwise of the boat. Into this sink three short lengths of dowel for smokestacks.

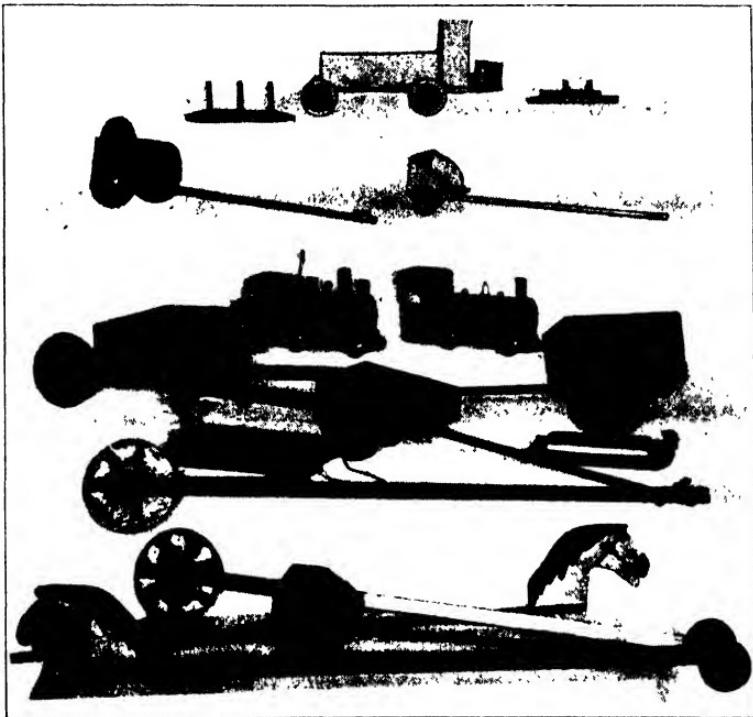
If a sailboat is desired, do not use the lengthwise piece of wood. Make a sail by cutting a doubled piece of cloth into a triangle. Wrap this sail around a tall thin dowel for a mast. Set the mast into a hole bored in the boat. Fasten the ends of the sail down to the boat by means of tacks. Sometimes further ornament is added in the form of small nails set close together all around the edges of the boat, with colored cords wound around them for a railing.

¹ See page 98.

² See page 99.

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Ringtoss. Sink a foot or more of heavy dowel or broom handle into a base of one-inch wood about eight inches square. Two thinner pieces, one smaller than the other, may be combined to form the base if the one-inch wood



VEHICLES

is not available; or two wooden circles of different sizes may be combined for the same purpose. The rings for throwing may be cheap embroidery hoops painted, or several thicknesses of flat reed, rope, or wire, wound with colored raffia or colored cambric. Sometimes children bring from the woods flexible willow twigs that may be formed into rings.

EDUCATION THROUGH MANUAL ACTIVITIES

Rubber-ring game. The end of an orange crate, or any piece of wood about sixteen inches square and at least half an inch thick, may be used. Screw into it at intervals some right-angled hooks. Paste or paint below each hook a number. The board is to be hung on the wall, and rubber rings, such as those from fruit jars, are to be thrown over the hooks. The board may be used to stress various number combinations.

Hammock stand. Measure the hammock from ring to ring as it hangs easily. Cut a base of wood about one half or five eighths of an inch thick, long enough to extend a few inches beyond the measured length of the hammock in swung position, and wide enough to seem to afford ample support to the hammock while swinging. Sink into this base two uprights of dowel, a little higher than the points where the hammock will be attached to the uprights. Cup hooks or slanting nails are put into the uprights to hold the hammock rings. The position of the uprights should be just outside the measured swinging length of the hammock.

Jumping-jack. Use a six-inch wooden circle for the body and a three-inch circle for the head. Attach the head to the body, edge to edge, by nailing a small strip of tin or wood to the back. Cut arms and legs from cigar-box wood or other thin wood. Drive a double-headed tack or a staple of thin wire into the top edge of each arm and each leg, or bore a tiny hole near the top of each. These hooks or holes are for holding the strings to work the mechanism. One horizontal string fastens the two arms together at proper distance, while another fastens the two legs together at proper distance. When these two strings have been attached, the arms and legs must be fastened to the body circle. Bore a tiny hole as near as possible to the top of each arm and each leg, and

WOODWORKING

attach the arms and legs through these holes to the body by means of thin upholstery nails with large heads. The arms are now attached to each other by a string and are nailed to the body, and the legs are attached to each other by a string and are nailed to the body, so there remains only to attach a string to both pairs to make them work together. Cut a cord about two feet long and attach one end to the center of the arm string, attach the same long center string to the leg string, and then allow the long string to hang free to be pulled. Arms and legs should dance freely when the string is pulled. If they do not, some adjustment is necessary either in position or in tension.¹

To make this toy very attractive, add a colored cambric hat, shoes, wrist ruffles, and neck ruff. Paint some colored buttons, and make gay facial features on the figure with printing sticks. The wooden parts may be varnished or shellacked first, and then the bits of color may be added.

Hobbyhorse. A child too young to cut out a horse's head with a coping-saw may still make a hobbyhorse to ride upon. He may find a suggestively shaped triangular piece of wood left by a carpenter, and fasten a length of stick to the longest edge of the triangle. The nose end of the head may be shaped with the saw, and a small hole should be bored into it to hold the reins. Scraps of black oil-cloth may be cut out and tacked into place for ears and eyes, and roving or rope may be frayed and attached for the mane.

PLAY FURNITURE

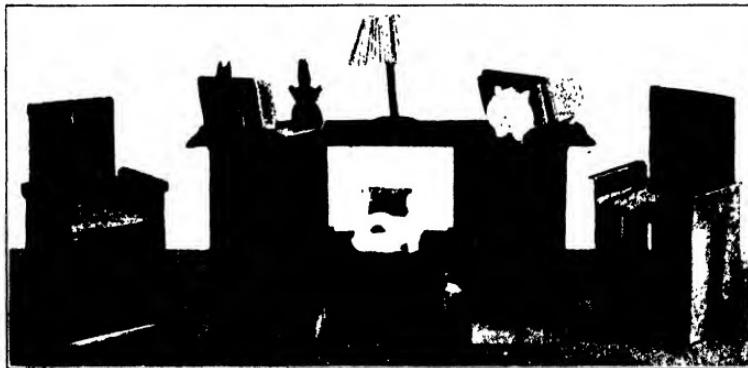
Chairs. The simplest way to make a doll chair is to find a wooden block for the seat and put against one side of it a board for the back. The tops of the chairs may be curved by older children. Another way to vary the shape

¹ See illustrations on pages 169 and 179.

EDUCATION THROUGH MANUAL ACTIVITIES

is to take a length for the backs of two chairs, and bore a hole with a large bit right in the center of the length. Now cut the board in halves crosswise, and the result will be two backs; the end from which a curved piece has been removed may look well for the legs of the chairs.

Small chairs with separate legs are difficult to make stable, although for a larger doll such a chair is easily made. Cut two front legs, and cut the back legs and



FURNITURE MADE OF ORANGE CRATES; BOOK-HOLDERS; TABLE LAMP

back supports all in one. The seat has to be cut out to fit into these back supports, and a solid or ladder back may be inserted between the two back supports. If desired, a chair may be made by cutting four legs to go under the chair, adding a separate back. Usually the legs of chairs are stronger when braced.

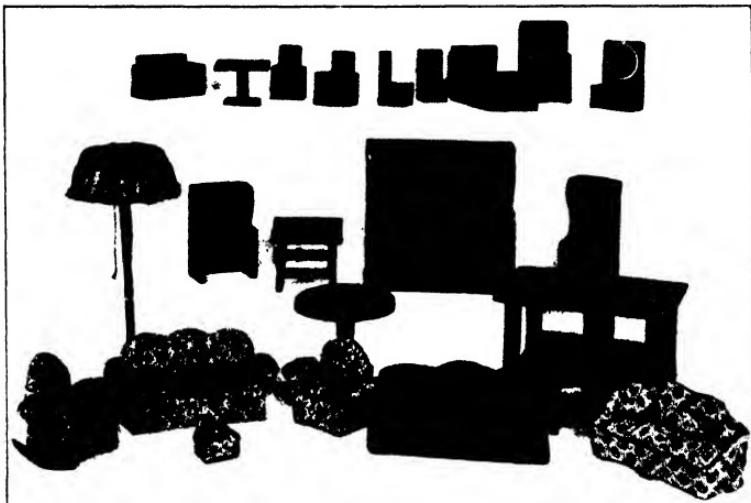
Sometimes, instead of putting in a wooden seat, rows of flat reed, raffia, or rope may be tacked or wound across the hollow seat made of strips of wood, and the same material may be used to weave in seats or backs of chairs. This weaving may be shellacked to harden it.

Another type of chair has arms and backs in solid pieces that extend down and form the legs as well. Settles

WOODWORKING

and Dutch and colonial chairs may serve as models for imitation of the simpler types.

A chair large enough for a child to sit in may be made from an orange crate. Take out one end of the crate, set it on the other end, and regard the center partition as the seat. Saw the sides off far enough down to leave short



WOODEN FURNITURE AND OVER-STUFFED FURNITURE

arms on the chair. These arms and the back will need a reënforcement of strips of wood to make them durable.

A simple rocker for a doll may be made of a pair of wooden circles with a seat built in between. The circles serve both as rockers and as arms. A tiny strip of wood has to be nailed across the back lower edges of the rockers to keep them from rolling over backward.

A davenport for a playhouse or for a doll house may be made by using a box for the seat and adding back and sides made from portions of boxes. A settle is made by putting a seat against a wooden circle for a back.

EDUCATION THROUGH MANUAL ACTIVITIES

The children can make chairs much more cozy and attractive by means of upholstery. Cushions of chintz or burlap remnants are easily made and add much to the effect.

Tables. A small dining-table for a doll may be made of a wooden circle with one central support consisting of a large spool or of heavy strips set in pleasing arrangement to give good support and shape. An ordinary four-sided table may be made by nailing a top to four legs, and then nailing braces under the table top between each pair of legs; or a table may be made in the Dutch style, with a top nailed to solid end supports slightly curved or otherwise relieved of plainness. These two solid ends should be connected by a brace that forms a shelf below. The table top should extend beyond each support, for about an eighth of its length. Other tables may be imitated.

A large table for children themselves to use may be made of two orange crates. Set them on end, with the shelves facing outward in opposite directions, and far enough apart to give the needed length for a library table. Make the table top of one board, or a combination of two or three boards. This top should extend out a little way beyond the boxes all around. A shelf may be inserted between the crates underneath. This shelf and the top board will stabilize the whole.

Piano. A piano, either large or small, may be made from a wooden box of the same general shape as an upright piano. Put on it a suitable top extending a little over the edge, arrange a slanting music rack and imitation pedals, and cut a board suitable for a keyboard. The keys may be of black paper pasted on a strip of Manila tag and glued to the board. This keyboard may be held up by cleats, or by floor supports braced below.

WOODWORKING

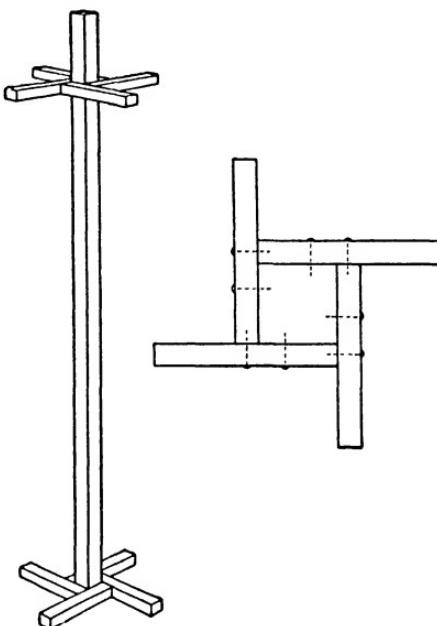
Lamp. Sink a dowel of suitable diameter into a wooden circle for the base of the lamp. The shade may be of paper or cloth. One floor lamp for a playhouse had a foundation for the cloth shade made of a barrel hoop attached to the broomstick upright by thin dowels crossing through the center of the hoop.

Bed. A newspaper is a good thing to experiment with in designing a bed. A satisfactory construction consists of a solid head and solid foot, with a box built between. The head and foot may be perfectly square or curved or cut out with a coping-saw. The bottom may be a solid piece, or it may consist of slats. Bassinets and cradles are described elsewhere.¹

Bureau. A small bureau may be made by nailing several long blocks close together, and one above another, against a back. Ornamental tacks may look like drawer knobs. A large dresser may be made of a soap box. Cleats should be nailed to the inside, upon which to rest the shelves. A curtain may be hung in front of the shelves and a small mirror on the wall above.

Buffet. A buffet may be made by combining wooden boxes of suitable shapes and adding a rail and top board.

¹ See page 103.



ONE METHOD OF MAKING A COAT RACK

EDUCATION THROUGH MANUAL ACTIVITIES

Clothes rack. One way to make this rack for dolls' or babies' clothing is to sink a dowel of the right size and length into a base heavy enough to support it. The crossed arms may be made of thin dowels put through the central pole, one a little below the other and at right angles to it. Another type has a square strip of wood for the central support. Four pieces of the strip material are used to make the base, by nailing these pieces against the central pole to form a swastika. Each piece is thus braced against the center and against the next piece. The arms may be longer pieces of thinner strips nailed to the upright in the form of a swastika, several inches from the top. The arms must be thin enough to allow hooks of coat hangers to go over them, or, if too thick, must have hooks put into them.

- GIFTS FOR FATHER AND MOTHER

Artificial Christmas tree. Cut about sixteen inches of five-eighths-inch dowel, and taper it to a point with plane and file. Bore into this stem holes large enough and deep enough to admit pine twigs stuck into them. Bore the holes at intervals to resemble the arrangement of branches on the trunk of a tree, and make them slanting so that the twigs will go in at a slight angle. Sink the dowel into a small but heavy base. At Christmas time the branches of fir or pine which are left over may be used to build up an artificial tree, to be trimmed for home or school use.

Plant stand. Take two six-inch strips of wood an inch wide and half an inch thick. Set these up on their narrow edges, and lay three other strips of the same size across them at equal distances. When these are accurately arranged, nail them firmly together. This is to keep flowerpots from soiling window sills.

WOODWORKING



SOME GIFTS FOR FATHER AND MOTHER

Top row: 1, twine-holder; 2, trellises; 3, bird sticks; 4, sconce. *Second row:* 5, door stop; 6, garden markers; 7, plant stands. *Lower row:* 8, letter-holders; 9, sewing stand; 10, towel rack. *At left:* 11, dish mop. *At right:* 12, sewing rack

Trellis. Cut two thin strips of wood about eighteen inches long and arrange them so that they diverge at one end and converge at the other. Cut three crossbars, arrange them at equal distances over the two long pieces, and nail securely. Another type of trellis is made by using one central support and nailing across it three crosspieces

EDUCATION THROUGH MANUAL ACTIVITIES

of appropriate lengths. A small cut-out bird may perch on the top. Taper the ends of the trellis that go into the pot or window box.

Spool-holder. Use a wooden circle and drive into it at equal distances around the edge thin nails that will hold spools of thread. A small box stuffed with a pincushion may be glued or nailed to the center if desired. Fewer nails may be put in for spools and a small hole made to hold a thimble. A small tin cover may be added for pins and needles, or other variations may be devised.

Twine-holder. Sink a short length of thin dowel into a small square base; this may be hung up or set on a shelf to hold a ball of twine. Another holder is made like a box with an extended back that has a hole for hanging the holder over a nail. The ball of twine is put into the box, and the end pays out through a hole bored in the bottom of the box.

Towel rack. This has for a foundation a piece of half-inch wood about fifteen inches long and four inches wide. A piece of dowel almost as long as the board is sunk into two little blocks nailed to the ends of the board. Another plan is to take a wooden circle whose diameter is the same as the width of the board. Cut the circle in two and nail a half against each end of the board. The dowel is then sunk into these two half-circles. If a removable roller is desired, the dowel may be cut somewhat longer than the board, and grooves may be cut down in the side pieces to admit the dowel, which may then be lifted out. Button molds may be fastened over the ends of the roller to keep it from sliding out.

Whisk-broom-holder. The back may be any suitable piece of wood shaped as desired. Nail at right angles to the back a little shelf which has a hole bored in it. The hole should be large enough to admit the handle of the whisk broom.

WOODWORKING

ARTICLES INVOLVING THE USE OF THE COPING-SAW

Sawing in outline may often be worked out experimentally, but many coping-saw problems involve a skill in fine line drawing that most adults as well as children have not mastered. Therefore, unless it can be made an exercise in drawing, resulting finally in a good design, it is often better to allow children to use a good pattern. For instance, a child could more easily evolve a design for a sled or a bed than he could for a cut-out animal, such as a hobbyhorse or a swinging parrot. Even when a pattern for a parrot has been given to the child, or a good model from which to copy a design, he still has several problems to solve in making the parrot swing. However, we shall limit the use of patterns to the situations that require them. Many of the designs mentioned in the following suggestions are included in a collection which is given in the bibliography at the end of this book. The purchasing address is also given there.¹

The material for this work with the coping-saw should be soft, such as basswood or soft pine, in thicknesses of from three eighths to five eighths of an inch, depending on the strength needed. Compo board also is sometimes used for this work. The saws and their uses have been described under "Tools."² As a rule, the ordinary small saw can produce any of these articles, although the larger coping-saw is more effective for heavy work.

In placing a pattern on the wood take care that, if possible, very delicate parts do not have the grain running across them, for breakage is much more frequent in such places. In cutting out animals or other figures having feet that are to stand upon a base it is better if the bottoms of the feet are straight, providing more contact.

¹ See Appendix A.

² See page 90.

EDUCATION THROUGH MANUAL ACTIVITIES

TOYS

Animal mounts. Any good animal pattern may be used and three-eighths-inch material. A stand may then be made to hold the animal, by cutting a piece of wood about three and a half inches wide and long enough to extend a good inch beyond the outermost limits of the animal. Mount the animal by means of two strips of thin wood cut about three eighths inch square and as long as the portion of the animal resting on the mount. For example, to mount an elephant, the strips of wood would begin at the front feet and continue back to the end of the hind feet. Nail these strips down on each side of the animal, holding it firmly upright. If more strength is desired, drive a few thin nails up into the feet from below. Sometimes button molds are added to these animal mounts to make the toy a cart that can be rolled. These molds may be purchased at a dry-goods store and may be put on with large-headed upholstery tacks. A small hole may be bored into the front of the mount, or a small screw eye put in, to hold the cord with which to pull the toy.

A variation of the plan given above is to mount an animal on a pair of rockers and thus make a rocking toy. A wooden wheel cut in two may serve as the rockers, upon which a small platform should be built.

Hobbyhorse. Use a pattern for a horse's head large enough to be realistic when attached to a stick to ride upon. Cut it out of wood a half inch or more thick. Bore a hole through the mouth at the proper place to hold cord reins. Mount the head by nailing the lower edge against a stick about thirty inches long. A pair of small wheels may be put on at the end of the stick if desired. One way to decorate this head is to shellac it first and then paint the mane, bridle, and other parts with color.

WOODWORKING

Tumbling toy. The usual tumbler is a figure of a clown or child in a sitting position with feet straight out in front, so that the legs are at right angles to the body. Its arms and hands seem as if in the act of turning over a pole or bars. A small dowel is put through the body, extending several inches on either side, and put in tightly. The proper placing of this dowel insures the rolling over and over of the figure by its own momentum on the parallel bars now to be described. Take a piece of half-inch wood about three and a half inches wide and about twelve inches long. Sink into the four corners of this base four pieces of thin stick or dowel, tall enough to allow the figure to clear the floor as it turns. With a figure about five or six inches in diameter, the uprights of the base should be about six and one half inches. Lay on the four uprights two twelve-inch lengths of stick or dowel and attach them to form parallel bars. If dowels are used, they will have to be flattened where they are attached to other surfaces. If the ends of these bars are notched a bit, the figure will not roll off. If the figure does not roll over and over by its own momentum and weight, the balance is probably at fault, but this can be remedied by experimenting.¹

Varied ringtoss. Some interesting variations of ring-throwing games may be made with cut-out figures. One such is a large clown with arms stretched sidewise. This figure, about twelve or sixteen inches high, may be sawed out and then mounted on a small, heavy base by nailing strips of wood on either side. The rings for throwing may be made as described under "Ringtoss."² These rings may be thrown over the head and over the arms of the figure, which should be gayly painted. This problem should be cut from five-eighths-inch wood by a capable, older child.

¹ See page 169.

² See page 111.

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Cradle. Make a paper pattern of the headboard and the rocker under it in one piece, and do the same for the footboard and its rocker. The construction necessitates the cutting out of two solid pieces for the ends and the building of the box or bed of the cradle between these pieces. Any good cradle design may be used.

Bed and chair. These articles of furniture may be prettily made with curved and varied outlines by the use of the coping-saw. Dutch and colonial styles may be used to advantage. The children may cut the shapes first from paper, and then, with some help, improve upon the proportions of these paper constructions. When a pleasing shape has been devised, the paper object may be reproduced in wood. The head and the foot of a bed may each be in one piece. A rocking-chair may be a seat built in between two side pieces that are both arms and rockers or arms and legs and rockers cut in one. These articles of furniture may be prettily upholstered in chintz.

Doll sled. Here a real sled with its characteristic curves may be imitated. The two solid runners and the top are shaped, and then the top is set on the runners and nailed. Small holes bored in the front of the runners provide places for attaching a cord for pulling the sled.

Gocart. Construct a seat large enough to hold a doll. It may have a curved back, and sides that curve from the back down to the floor of the seat. Mount on two wheels and add a tongue for wheeling.

OTHER GIFTS FOR CHILDREN

Toothbrush-holder. Use a pretty design to serve as the back of the holder. A small rabbit standing up with paws in front is one suggestion. Now cut a small piece of wood for a tiny shelf, to be nailed against the rabbit in such a

WOODWORKING

position that he seems to be holding it with his paws. Before nailing this shelf on, bore a hole in it big enough to hold a toothbrush. The hole should be large enough to admit the handle but not the brush itself. Nail the shelf on and decorate the whole. This article is often an incentive for using a toothbrush.

Napkin ring. This may also be made for a child. Find a suitable pattern, such as a small rabbit, chick, or other low-lying figure. After it is cut, mount it on as tiny a base as will support it, and bore into the figure, just above the base, a hole large enough to admit a rolled napkin. If desired, the base may be omitted and the holder balanced with the rolled napkin only.

Bookracks. Cut out two figures alike, such as a pair of squatting rabbits or of small elephants. Place between these two standing figures a horizontal board about a foot long and three and a half inches wide. The board may be put in a position a little raised from the floor, so that the feet of the animals will seem to be the short legs of the stand. Nail these three pieces together. Hinges have not been found to be very satisfactory. This rack will hold a number of the small-sized books dear to children.

Another rack for books or other possessions may be made by cutting two figures, each perhaps five or six inches long. Set them up four or five inches apart, and build a floor and side pieces between them. This makes an attractive box.

Still another style is in the form of book-ends. A design such as the tall rabbit may be used. Cut two of these figures out of half-inch wood and attach to each of them, at right angles to the lower edges, a small board nearly as wide as the rabbit and about six inches long. These boards may be prettily pointed at the free ends. They

EDUCATION THROUGH MANUAL ACTIVITIES

serve as floor rests upon which the books are placed, thus adding the weight necessary to hold up the stand and books.

Coat-hangers for dolls or babies. Simple hangers are made by following paper patterns which copy the ordinary bowed shape of a hanger. Cut these from wood, and then insert into the top a very large metal ring by means of a small screw eye opened to admit the ring, and then closed again. The ordinary hook has a diameter too small to put over a clothes hook, and its screw is usually so large that it splits the wood.

Another hanger is made in two pieces. One piece is a girl's head, the other is a pair of arms outstretched. The head is later nailed from the back against the pair of arms, and the whole is nicely decorated. Sometimes a pretty picture of a head in colors may be glued on the wood and cut out. This design may be worked out in one piece instead of two.

Still another hanger is made by cutting a pattern like an ordinary hanger except that it is much enlarged and prettily shaped at the center top. A large hole may then be bored in this enlarged center, for putting the hanger over the clothes hook. The hanger may be decorated with small figures painted or pasted on.

GIFTS FOR FATHER AND MOTHER

Letter-holder. Cut two pieces of wood about eight inches long. One of these should be somewhat narrower than the other, one perhaps three inches and the other five inches. Curve each piece along one long edge. Now stand the two pieces on the long uncurved edges, the narrower piece in front of the wider. The distance between the two pieces should be about three inches, so that the holder will hold

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several letters. Build a floor and, if desired, low sides between the curved pieces.

Ornamental twine-holder. Find an artistic picture, in color, of a colonial girl with spread-out skirt, a Dutch woman with a basket, or other suitable subject. Draw around the figure on the wood, and cut out. It is best to leave a square of wood around the feet to make the figure easier to mount. Glue the picture to the wood. Bore a small hole through the figure, either between the hands or in the top of the basket or in any place where it would be appropriate for yarn or string to emerge.

Now construct a small stand, consisting of a square of half-inch wood. Nail the figure against one edge of this base. Sink a short length of thin dowel into the center of the base. A ball of twine put over this dowel is concealed by the figure, and the end of the twine is pulled through the hole bored in the figure.

Swinging parrot. This is an ornament for the porch or nursery. Cut out any good pattern of a parrot, cockatoo, or other bird with long tail. In the place where the claws are, enlarge to make a solid piece rather than the too delicate claws. In this solid piece saw a narrow vertical cut that will admit a small, flat insert at right angles to the surface of the parrot. This insert should have two prongs that extend downward and will eventually form the pivot upon which the bird balances. The end of the tail must have metal weights, such as washers, glued to it until the parrot balances back and forth by its own weight. It may seem at first that the bird is already too heavy to require weights, but experience shows that at least two and sometimes three washers are necessary. These have an opening half an inch in diameter in the center.¹

The parrot may balance on a suspended circular perch

¹ See illustration on page 169.

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made of a wire, a heavy reed, or an embroidery hoop. Or it may balance on a perch made by sinking a thin dowel into a wooden circle. The circle is to be nailed to the wall, and the dowel must be flattened where the parrot touches it. Still another perch is made like a stand. A piece of dowel is sunk into a small but heavy base and another dowel nailed across the top of the first as a crossbar, flattened where the parrot is to perch. If the two prongs of the insert that was glued into the bird's claws are merely set lightly on the perch, the parrot will swing back and forth. If the parrot will not swing, the weights in the tail must be adjusted.

Doorstop. A figure such as a sitting cat about ten or twelve inches high is good for this purpose. Cut it out of wood half an inch or more thick, and nail it against a door wedge made of one-inch wood whittled to an edge. A piece of felt may be glued to the bottom. The stop is used by pushing the thin end of the wedge under the door.

Window wedge. Any small figure, such as a bird, may have a wedge-shaped extension. This is put into a rattling window sash to silence it.

Bird sticks. These may be made to ornament flower-pots and window boxes. Find a life-size bird pattern and cut it out of thin wood. Even quarter-inch wood is good for this purpose. In cutting out the bird it is well to remember that a good place for attaching the stick to the bird is required. Delicate claws are often replaced by a solid piece, with one straight edge or a small corner against which the stick can rest securely. Cut about eighteen inches of thin dowel, point one end in the pencil-sharpener, and attach the other end to the claws or body of the bird. One way is to drive a thin brad into the dowel, then cut the top off the brad with a wire-cutter, and gently pound the bird down over this brad. Add a little glue in the

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joint. A simpler way to attach the bird is to use a thin square stick instead of a dowel, and tack it flat against the body of the bird. The side of the stick may be shaved off where it touches the bird. Paint the bird with natural colors and markings taken from a good picture.

A very attractive way to mount a cut-out bird is to find a natural twig or branch in the woods. Attached to this the bird has a more realistic look.

Garden markers. Use a good vegetable pattern about two or three inches in size. In designing add a pointed thin projection for sticking into the ground. For instance, an onion might have a pointed stick, about four inches long and an inch wide, around or along which the root of the onion might cling. Draw a face on the onion with a weeping expression and falling tears. Paint in realistic colors and use to mark the garden row or plot in which onions have been seeded. A collection of these garden markers in realistic form and color would make a good gift for a parent who has a garden.

Sconce, or wall candlestick. Cut a piece of half-inch wood about four by eight inches. Curve one end and bore in it a small hole for hanging. Cut a second piece about an inch thick and three and a half by four inches, and bore almost through it a hole large enough to hold a candle. Or, instead of using the thick wood, cut the second piece from half-inch wood and nail to it a tin cup of the right size to hold the candle. If desired, this tin cup may be sunk into the wood by means of a hole bored in it. When the two parts of the sconce are ready, nail the one at right angles to the straight end of the other.

CHAPTER V

BLOCK BUILDING

Blocks for building structures of various sorts are of universal interest to children, and should be considered a part of the play equipment of children, at least in kindergarten and the first grade. Early in this period block building seems to be intimately associated with dramatic play. Blocks are quickly set up to symbolize some idea in imagination, and then are changed just as quickly as other ideas crowd in upon the first. There seems to be very little desire at this age to be true to form, and the probable value in this type of crude and shifting building is the free play of ideas. Later, when children are anxious to build structures that resemble real things, it becomes possible to use observation and other ways of improving form.

KINDS OF BLOCKS

There are several very good kinds of blocks on the market. It may be said first that poorly made, light-weight blocks are not satisfactory. Structures built with these cheap blocks fall easily, and children become discouraged. Good blocks do not wear out or deteriorate in any way, and are therefore an economical purchase. Purchasing addresses will be found in the Appendix.

Froebelian blocks. These are among the oldest and best known of building blocks. The original blocks were very small, but this size should not be purchased, for the enlarged blocks are far better for children. These may

BLOCK BUILDING

be purchased from kindergarten-supply companies. A box of hardwood blocks called *fifth gift*, together with one called *sixth gift*, makes a good assortment of about a hundred blocks in different shapes, the largest block being about two by four inches. These blocks are good for an ordinary small building, and more sets may be added as desired. These blocks are often sold in larger assortments at a cheaper rate than the boxed gifts.

Hennessey blocks. This set is made up of larger blocks, and comes in a box about thirty by eighteen inches which rolls on casters. Larger structures are possible with these blocks.

Hill floor blocks. This set is composed of the largest blocks yet devised, and was designed by Professor Patty Hill of Columbia University. Some of these blocks are as much as a yard in length, and include corner posts, girders, and wheels, enabling children to build structures and vehicles large enough to get into. There are hundreds of blocks in the set, the purchase of which entails a large sum of money, but they may be purchased gradually in installments. This set of blocks is eminently worth while, and makes a very fine addition to the play equipment of children.

Stabuilt blocks. The blocks of this set are made with perforations and are put together with wooden pins. Many things may be built with these interlocking blocks.

Builder boards. This is a set of boards with screws and perforations. These boards can be put together easily to make chairs, tables, and other furniture large and strong enough to be used by children.

Cement tiles. Tiles of various shapes and colors, such as are used for floors, may be used for laying designs on the floor or on tables. They may be purchased of any dealer in floor tiles. Consult a dealer's catalogue.

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ACCESSORY MATERIALS

There are many accessory materials that offer a stimulus to the interest in building by providing good motives. Dolls, animals, and vehicles stimulate the desire for houses, barns, furniture. Pictures of farm buildings, ships, and other

structures are suggestive, supplementing real observation and clarifying children's ideas. The animals may be cut out of wood or celluloid, or papier-mâché animals may be purchased. Besides the usual dolls there are some interesting and beautifully made wooden dolls called Tillicum Tots. They come in various sets which represent different occupations and families. They are very durable, artistic, and useful in stimulating building and other play activities.



THE THREE BEARS' HOUSE

Made with the Hill floor blocks

Some pieces of compo board, cut into sizes varying from a foot square to larger sizes, may be used by children as foundations upon which their block structures may be easily moved. These boards also serve as second-story floors or as roofs. Wooden boards may also be cut to serve in building.

BLOCK BUILDING

Window frames may be constructed which may be inserted into a structure as needed, much as real window frames are used. They are made by nailing together four strips of wood half an inch thick and about two inches wide. Crosspieces to separate the imaginary panes of glass may be put in if desired. These frames are set in place, and the blocks are built around them.

There are other miscellaneous things that aid children in giving form to their ideas. These are too numerous to mention, but a few examples will suffice to show how alert the teacher must be. Sticks, paper, paste, and such materials should be within reach. The child who is building a zoo may need sticks for the bars of a cage; the child who is making a house may need a sheet of paper for a roof.

HABITS TO BE TAUGHT IN BLOCK BUILDING

Children should be encouraged to share blocks willingly, to build far enough away from the buildings of other children, and to use care in walking about so that they will not destroy each other's work. Buildings should be taken down rather than carelessly knocked down, and all blocks should be put away by the children themselves. Putting blocks away may be a long process unless children are encouraged to think out quick ways of managing, such as making piles that can be moved easily and piling many small blocks into baskets or upon boards, instead of spilling large armfuls or running to the box with one or two blocks.

In building, children should desire better and better types of structures after they have passed through the manipulative stages. They should become more and more dissatisfied with loose corners, rough walls, and hit-or-miss structures. Gross errors in proportion, the use of several

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different kinds of blocks where uniformity is better, glaring omissions such as a house with no door,—these and other situations may be approached through suggesting to the child the use of the structure, and by urging him to use his reason and observation to create a more critical attitude. However, it should be added that this process of getting better form must not be forced too early. In any type of imaginative expression it is important to have many spontaneous ideas, and this freeing of imagery, especially in the earlier stages, is more important than perfection of form.

PROJECTS ARISING FROM BLOCK BUILDING

As children carry out their ideas in block structures of various kinds, the teacher often sees the possibility of enlarging and enriching some vital interest of childhood. An interest in boats may result in making a number of boats and a dock and waiting room for passengers, or various bridges for boats to pass through or under. An interest in houses may result in a whole village with many kinds of buildings, people, and vehicles. An interest in inclosures for animals may turn into the arrangement of a whole farm or zoo, and may be the motive for constructing more and more buildings related to a central idea. Parks, rooms furnished with block furniture, railroad systems, the setting of the "Three Bears" or of any other story, are among the possibilities in enlarging the children's isolated ideas of building.

Often when watching an individual child at work with blocks, the alert teacher sees a strong interest arising, out of which she may develop a more coöperative project of wider scope.

CHAPTER VI

PAPER-CUTTING AND PAPER CONSTRUCTION

Paper as a material for handwork has long been used in the kindergarten and primary grades; in fact, it was formerly almost the only material to be had. In many schools it still is the leading manual material, although other materials are easier and, for many purposes, much more profitable to work with. It seems best to use paper when it is the most appropriate material, but not otherwise. To limit children to paper for their handwork deprives them of many of the activities which have true industrial worth, and forces them to substitute imitation for real activity. There is no comparison between the value to the child of a real wooden table made with tools and a paper table which never can serve as a real table does; nor is there any comparison between actually dipping or molding candles and merely cutting representations of candles in a secondhand manner, unless the latter follows the real experience. With our attention centered on actual rather than imitative experience we should be able to fit our materials to our purposes and should choose the most vital.

Many teachers report that their school officers are perfectly willing to buy large quantities of paper because it has always been done, but that they are unwilling to buy clay and wood. This is a state of affairs that works harm to children and is at best poor economy. Materials are only media or vehicles of expression, and our attention

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must focus on that idea rather than on the intrinsic merits of each material or the traditions concerning its use in the schools. A little study of comparative costs of paper and other materials, and a comparison of what can be accomplished in each, should convince anyone that other materials are often more worth buying than paper.

Teachers usually designate paper work in two ways: By paper-cutting they mean the free-hand, story-telling activity by which children cut from paper flat representations of things seen or imagined. By paper construction they usually mean making objects with three-dimensional form by cutting, folding, and putting the paper together with paste or other fastening material.

DIFFICULTIES IN FREE-HAND PAPER-CUTTING

Judged by the amount of paper-cutting that is done and the attention given to it in manuals and magazines for teachers, one would suppose that free-hand cutting of objects is an easy accomplishment and that it is one of the most important activities. Yet this work involves some difficult forms of technique. Let us analyze the activity and find out how difficult it is, how we can justify its use, and what we can do to make it worth while to children.

Limitations of the child's mental images. The child's mental image is not clear. In the first place, we are asking the child to express his mental image of a thing in a clear-cut manner when probably the image he holds of that thing is very vague, incomplete, or meager.

The mental image is in terms of detail rather than of mass. When we ask a child to cut a picture of a person, we assume that he is able to see that figure in terms of the silhouette, contour, and mass effect, and that he can

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begin anywhere and continue the cutting of a continuous outline. On the contrary, the child has always seen things in terms of their detail. When he draws a man, for example, he may draw the body ; then the top of the body outline shows the child where the head is to be attached, and the top of the head shows where the hat is to be drawn. There are many more guides in drawing than in cutting. It is a trained vision that sees the outline view or entire aspect of a thing without the detail. A mental image must be very clear indeed to make this type of vision possible.

Mechanical difficulties. In cutting there is a tool to manage, which must be operated with one hand while the paper is turned freely and quickly with the other hand. Watch a grown person cutting, and see how his long fingers spread out, holding the paper in a good position ; see how he makes many deft, slight movements of the left hand as it feeds the paper into the scissors. This requires a good degree of muscular control and teamwork between the two hands as well as between the hands and the eye. Moreover, the mental image must be in the center of attention. Children are only beginning to acquire these various kinds of teamwork or coördination, and we must wait for mere physical growth to take care of some of it.

SOME STAGES IN PAPER-CUTTING

When a child first uses scissors he has to get acquainted with them, and he must learn how to make them cut. These problems are at first enough to occupy the attention without having to express ideas at all. Practice to get greater control of paper and scissors may come about through cutting out pictures from magazines to put into booklets, and mere experimental cutting of paper should also be considered a proper first stage. Not until after

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the child has had a chance to become physically adapted to his material should we think about expression.

We may then take him a step farther by seeing a resemblance to objects in his snippings and accidental shapes. Thus we may encourage him to formulate a purpose and to feel satisfaction in achievement. A piece that looks like a stocking may be pasted to a penciled clothesline drawn on paper. A triangular shape may look like the sail of a boat or like the body of a kite.

A third step consists in suggesting an addition to his cutting or a change in it. For example, in the case of the clothesline a child may have it suggested to him that he cut another stocking to match the accidental one, or the child with the sail may now attempt to cut a boat to hold the sail, and the child with the kite may make a tail to go on it. Thus the child is encouraged to create something new with the material.

A fourth development may be a more critical attitude on the part of the child. We may encourage him to show us the sharp corners on the apple or snowball. With confidence somewhat established, and with success a powerful factor, the child may become at ease with his material so that expression may take place to better advantage. Makeshifts, such as pasting on tails or forgotten parts, are allowable at first when children are beginning to use the silhouette memory of a thing.

HOW DOES IMPROVEMENT COME ABOUT?

Since the child will probably cut what his mental image of a thing directs, provided he has learned to use his material physically, we may expect improvement to come about in part with the improvement of this image. To follow an attempt at cutting out rabbits with actual ob-

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servation of rabbits or, if that is impossible, with the use of good pictures, will make a child, with his problem in mind, look at the rabbit more closely. In other words, actual experience with real things, or with very good representations when the actuality is not possible, is the great need in the improvement of imagery. Then that experience should be interpreted by more drawing, modeling, or cutting, as well as by discussion and comparison, to improve the mental images.

As children learn to use scissors, they should be definitely shown how to feed or turn the paper with the left hand, as the natural tendency is to hold the paper tightly in the left hand while turning the right hand into impossible positions.

Models are useful only in changing or reënforcing mental images. Little children are not able to work directly from models. Only good models should be used, and these more with the idea of clarifying thought than of serving for imitation. Sometimes teachers cut paper in the presence of the children. This seems valuable from the mechanical point of view, to give children an idea of how to hold or otherwise manipulate the paper and scissors, but it hardly seems worth while to think of it as a means of giving children ideas of form. Most teachers are not accurate enough in their own representations to give children true ideas of form. It seems a dangerous thing unless a teacher is really skilled.

In some schools a great deal of tracing of animals is done, and these traced figures are then cut out by the children. In certain situations this would be allowable, but there is a danger that, if too much of this is done before the children are well started in free expression, they will become dependent upon patterns. This result has been observed many times, and the teacher must

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keep it in mind when she plans her work. At best the tracing and cutting out of figures has little to commend it for regular use, but has more justification as an occasional activity when a definite need arises for it.

Paper-tearing is an activity which does not require the use of scissors. As an activity by itself it serves the purpose of expression much as paper-cutting does, and seems quite as proper and perhaps easier at first. As a transition to paper-cutting, it does not seem very pertinent, since the handling of scissors will have to be managed eventually, and there is little transfer of skill from paper-tearing to paper-cutting.

PAPER-CUTTING IN THE EARLY GRADES

On the whole, paper-cutting should be regarded as a slowly achieved ability and, when it is introduced, the difficulties that confront children because of insufficient mental and muscular development should be kept in mind. In the kindergarten paper-cutting in the free way should be reserved for occasions when strong motive is present. To cut out jack-o'-lantern faces or snow men in sections or other very simple and interesting objects in connection with actual play experience offers problems that may be met by the children of four and five years of age; beyond this, free-hand cutting is best deferred to primary grades, and then developed gradually.

In primary grades children enjoy illustrating rimes and stories with paper-cutting, although a more natural medium is crayon and paint. One way to use cutting as a group or social activity is this: A screen or poster is put up to hold the illustrations for the story of "Three Billy Goats." The children are divided into little groups which undertake to cut the needed things. One group plans

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the cutting of the bridge, another group offers to make goats, another the troll, while a fourth group makes the trees. When the bridge is ready, the teacher and children pin it in place on the screen. The billy goats are then held up and the children choose the three best or make suggestions that lead to more successful cutting. The best troll is chosen, the trees are selected, and the whole is built up before the children amid great interest and enthusiasm on their part. Many children do very well in this situation who are indifferent when working individually. This social illustration of stories would be a good preparation for individual attempts.

DECORATION WITH PAPER-CUTTING

Repeats may be made by folding a strip of paper over and over, and then cutting from it some figure, such as a tree, cutting so that there remains a hinge or joining on the fold. When the strip is opened, there will be several trees joined together. These may be used in groups to decorate booklets or other things. A similar activity is that known as surprise cutting. A square or circle is folded over and over, and then various bits of the folded paper are cut out here and there. When it is opened, there will be a surprise. This idea may be used in making cut-out decorations to mount on another color, or in making doilies for table decoration. Any child may learn how to fold a square of paper into sectors, and then to cut scallops for a doily.

Boxes often need to be decorated to hold gifts. Repetition of a cut motif is very useful, especially in border patterns. Fans, wall paper, and many other things offer good incentives for this type of decoration. Thin colored papers sold by school-supply firms are useful.

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A paper doll offers good opportunity for working out costumes. Children plan their own costumes, and collect bits of lace paper and other attractive materials for the work. The teacher directs the development of the children's ideas in regard to color and other standards, but there is much opportunity for original and interesting projects to be worked out by individual children, perhaps in the unsupervised periods. The dolls may be purchased, but they may also be made by pasting a good illustration from a fashion sheet on cardboard and cutting it out. Trunks, suit cases, and wardrobe cupboards may be made, to hold the doll's garments./ One child made a folder that, when stood up, had a thin stick put through it for a pole upon which to hang the garments on cardboard hangers. When the child wished, she could take out the pole and fold up the garments of paper into the wardrobe folder, which could be put away as an envelope.

Homemade valentines should be appreciated by teachers, and the making of them should be encouraged in order to supplant the commercial variety, which are often in poor taste and unchildlike in idea. Any child can learn to cut a heart pattern by folding the paper double. After a little practice even four-year-olds have enjoyed doing this. Once learned, this makes a child more free to invent valentines. A heart may be decorated with appropriate colored pictures cut from magazines, or with Cupids or other valentine symbols cut from patterns. Lace-paper doilies are useful, as are also bits of lace shelf paper or candy-box trimming. Hearts may be overlapped or strung together. Little doors may be cut into hearts, and a picture put back of the opening. Little envelopes inclosing messages may be mounted on hearts or concealed within them. Doilies or other parts of valentines may be mounted on little paper springs. Another idea is to make figures of

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people or animals by combining different sizes of hearts, and another is to form little decorations on valentines by means of small hearts arranged in designs, such as the four-leaved clover.

Teachers should encourage children to write messages that are sincere, and to write a message on a piece of paper and tuck it away in some appropriate part of the valentine rather than to spoil the looks of the whole by scrawling the words in large handwriting over the entire surface.

PAPER CONSTRUCTION

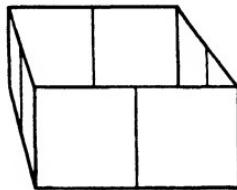
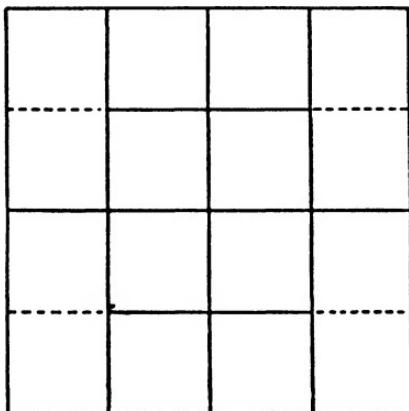
Paper construction should bring problem-solving into play. To buy a package of patterns for tables and chairs, to draw around them, cut them out, and put them together according to directions seems to have but slight educational value. This amusement might often be given to sick children, but it does not seem worthy of the powers of a healthy, normal child ; at least it is not educational in content, for at best it is an exercise similar to picture puzzles.

Another, more educative method for paper construction is to proceed experimentally. For instance, if a child needs a receptacle in which to carry home seeds and nuts from the woods, the need for the basket stimulates him to fashion some crude container. He does something to the paper so that it will hold nuts, and he does it by using his own intelligence rather than that of some other person. When the first attempts to make baskets are somewhat worked out, they are compared and tried out by the children by putting things into them and deciding what is good or bad about them. After this exchange of opinion the children improve upon their first attempts, trying to make the basket serve the intended purpose more adequately. Anyone can see that in this type of

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construction the children are able to grow mentally. The objection will be made that the form of the baskets will be crude. Undoubtedly it will be, but there is plenty of time for better form to follow.

When children have had experience in handling paper and making it serve their needs in this crude way, there are many definite ways of folding and handling paper that children may be taught. To know how to make these



THE SIXTEEN-SQUARE FOLD

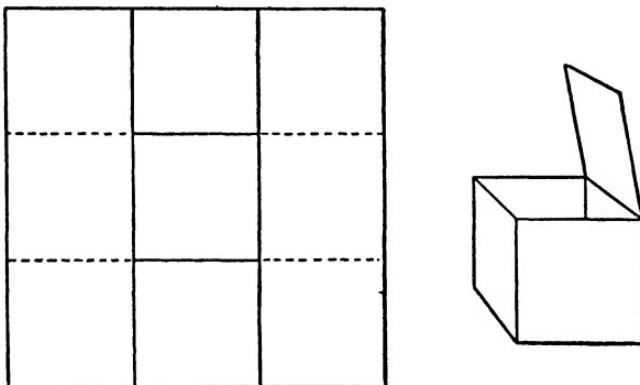
basic or fundamental folds, and then to choose from them and apply them to any problem that may arise in paper construction, would give children considerable power. In this way the technique of the teacher will follow and supplement that of the child, as it should, instead of preceding the child's attempts and dwarfing his initiative.

SOME FUNDAMENTAL FOLDS

Sixteen-square fold. Fold together any two opposite edges of a square piece of paper and open. Fold the opposite edges in the same way and open. You now have

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two center creases crossing each other. Fold the first two edges to meet their center crease, open, and do the same with the other two edges. You will have, when finished, sixteen squares of equal size. An oblong may be folded in the same way, resulting in sixteen oblong spaces of equal size. In either the square or the oblong, cut into two opposite edges, cutting on the creases nearest the corners of the paper, and cutting as far as the first crease



THE NINE-SQUARE FOLD

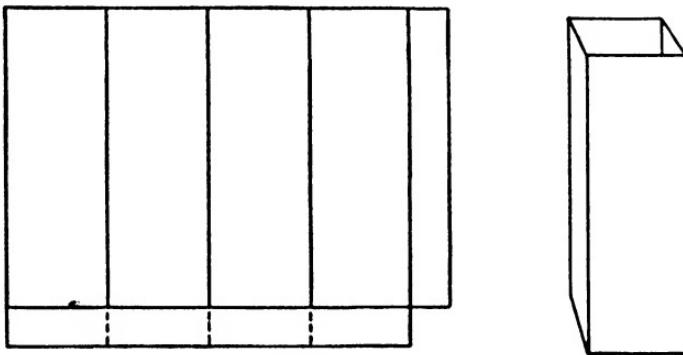
going the other way. In the case of an oblong, cut into the short edges. You will have in all four cuts in your paper. Now turn the corner pieces inside the center pieces on each end, and paste. The sixteen-square fold may be the basis of many pieces of furniture, vehicles, and boxes. A little experimenting will show the children the possibilities of this fold.

Nine-square fold. Fold over one third of a square of paper. Open, and fold the other edge to the crease made. Turn the paper around and fold in the opposite direction in the same way as before. The result will be nine squares of equal size. To make, cut into both creases on each of

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two opposite ends of the paper, cutting as far as the first creases going the other way. Paste the corner laps inside the center pieces. This fold will make a box as deep as it is wide. A cover may be made attached to the box by taking a longer piece of paper than the square and laying out on it a cover in the proper place before cutting.

Chimney fold. Take an oblong piece of paper. On a short side fold down a flap half an inch wide. Keep this

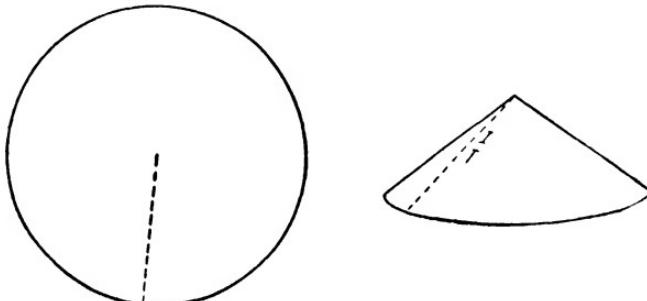


CHIMNEY FOLD

flap down and disregard it. Now fold this folded edge to the opposite edge, open, and fold each edge to the center and open it all out, even the flap. Now fold down a half-inch flap on the lengthwise edge of the paper. Cut out the intersection of the two flaps, which will be a half-inch square. Cut into the lengthwise flap at each crease, cutting as far as the crease. Now fold the whole into a chimney, pasting the short flap underneath or inside, and making the small sections of the cut flap serve as a supporting floor or base of the chimney. This fold may make a chimney, a pillar when made long, or a basket if a bottom is pasted over the flaps turned in. Little sections of a basket may be turned down and decorated.

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Conical fold. Use a circle, and cut into its radius as far as the center. Lapped slightly, this fold makes a silo roof, a circus-tent roof, or a Japanese hat. Lapped more, it makes a tepee or a May basket. By varying the amount of lapping, many shapes may be made. By turning one edge of the cut radius in one direction, and the other in the opposite direction, a pair of twin baskets will result which may have a handle fastened between them. If



CONICAL FOLD

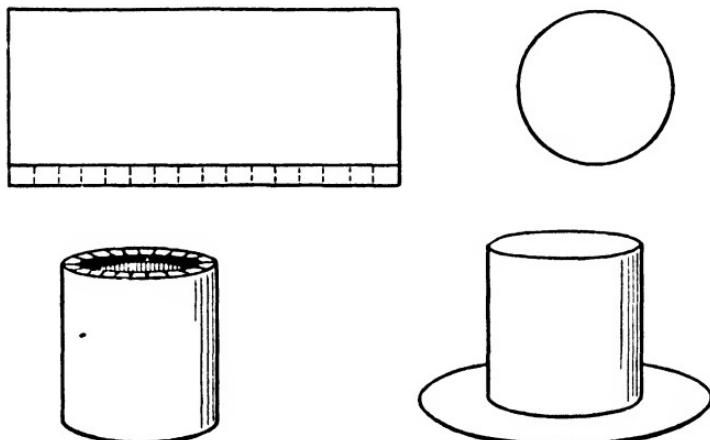
desired, the circle may be folded into sectors instead of merely turned, with the result that various many-sided constructions may be made.

Round formation. To make a sailor hat, a tub, or a pail, first cut a circle of paper. Then cut a strip of paper as deep as the object is to be plus a little for lapping, and as long as the circumference plus a little for lapping. Fold down half an inch all along one long side of the strip. Cut fringes, about a quarter of an inch wide, in this opened flap as far as the crease. Now lap the ends of this strip, turning in the cut fringes at right angles to the strip. Put paste on the under side of the fringes, and also around the edge of the circle previously cut out. Lay the circle down with the paste upwards, lay the other piece down on it, then dab gently with a pencil inside

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the object until the paste holds well. For the sailor hat a brim must be added to this crown.¹

A round pillar may be made by using a tall, narrow piece of paper and proceeding as in this round formation. In the case of a porch pillar the fringes themselves would probably be pasted to the floor of the porch, without making a bottom. See that the fringes are long enough.



ROUND FORMATION

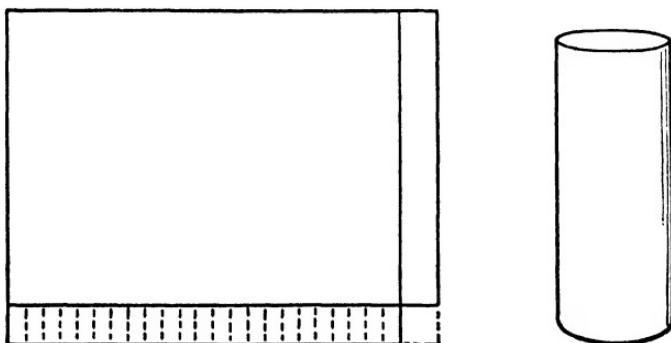
First, strip for the round formation; second, circle for the top or bottom; third, strip ready for the top; fourth, hat made with the round formation

Bushel basket. This may also be used for a certain type of Indian dwelling, for animal cages, or for other suggested constructions. Cut eight thin strips of paper about eight inches long. Cross two in the center, cross another over the center, spacing it evenly between the others, and so on, adding each strip until you have the eight placed like the spokes of a wheel, crossing in the center. Put a pin through the center to hold them together temporarily. Bend up half an inch at the end of each spoke. Make a

¹ See page 155.

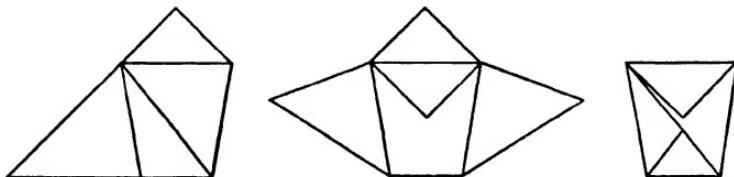
PAPER-CUTTING AND PAPER CONSTRUCTION

hoop or round band for the top of the basket by lapping and pasting the ends of a long, thin strip. Now arrange the hooked spokes over this band, pasting each lapped hook over the band. Handles may be added if desired.



PILLAR

Drinking-cup fold. This may be used not only for drinking purposes, but also as a hat for patriotic festivals, or as a May basket or when a need arises for a quickly made container. Fold a square of paper diagonally across the



DRINKING-CUP

corners and crease. Holding this diagonal fold toward you, pick up one of the side points and bring it across until it touches the edge on the other side. It is in proper position when the peak of the folded paper, as it lies before you, has an isosceles triangle at the top, left by the

EDUCATION THROUGH MANUAL ACTIVITIES

crossing of the side point across the paper. Another way to describe it is this: With the crease toward you, bring one side point across to the opposite edge of the paper so that the upper edge of this laid-over point is parallel with the crease at the bottom. Now pick up the other side point and lay it across the first to a corresponding point on the other side. Fold down the flaps at the top, and the cup is finished.

SUGGESTIONS FOR PAPER CONSTRUCTION

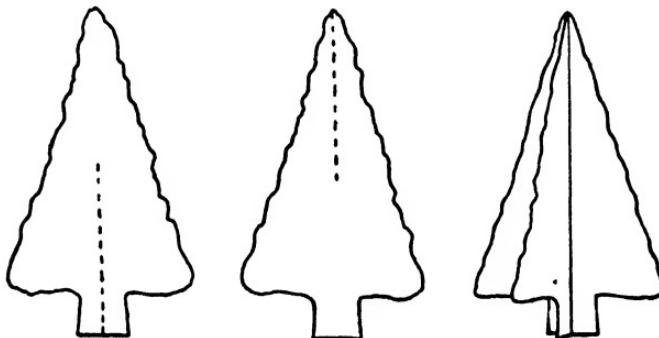
It is not intended to point out all the possible forms of paper construction, but only to suggest some of the more attractive and useful things that may be made. Again we urge that, although very definite ways of making are given, when at work with children the good teacher allows them to arrive at results experimentally, using her knowledge as a reserve from which they may draw as they work out their own ideas.

Buildings. The nine-square fold makes a flat-roofed building. For a gabled structure get if possible a piece of paper as long as the whole outside measure of the four sides of the house. At one end of the long side block out with a pencil the front of the house with its pointed gable, and see that there is a flap of paper left at the side front of the house, to which may be pasted the adjoining side when the four-sided inclosure is ready to put together. Also allow some flaps on each side of the gable to attach the roof to later. When the front of the house has been sketched, draw next to it the side of the house, which will be a straight four-sided piece, then the back of the house corresponding to the front, and lastly the side that comes around to join to the front. Cut on the lines and bend the paper for the corners of the house, after cutting out doors and windows

PAPER-CUTTING AND PAPER CONSTRUCTION

as planned. Add porches, trimmings, or other features. The roof may be a sheet of colored paper folded in the center and laid over the gabled structure so that the edges of the roof overhang well. Some particular ways of making characteristic buildings will be discussed in another chapter.¹

Trees. Flat cardboard or paper trees are suitable for puppet shows or other scenes where only one view is



SLIP-IN TREE

needed. They may be fastened with thumb tacks to the screen or to old tables, or stuck into sand, although the latter plan is not very satisfactory.

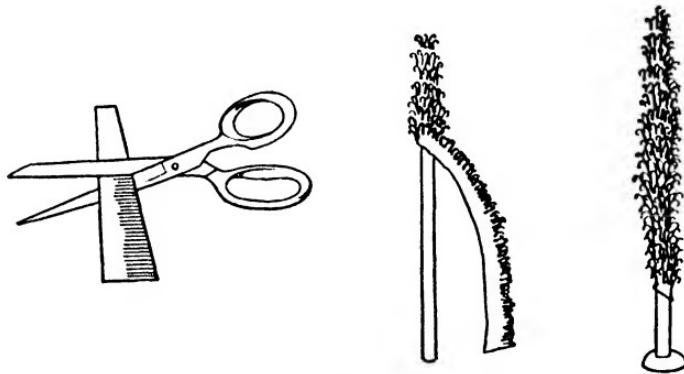
A slip-in tree has the advantage of having three dimensions, and is more effective in scenes laid out on tables. Take two pieces of green construction paper and, holding them together, cut out two flat pictures of pine trees. Take one of these and begin to cut from the top of the tree, cutting down on the center line until you get just beyond the middle. Take the other tree and cut on the center line, upward from the bottom just beyond the middle. Now take one tree in each hand, and slip one

¹ See page 194.

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over the other at right angles to each other, making a tree with branches pointing in four directions. To make it stand, fold back some flaps at the base and paste or tack down.

For a fringed tree take either a single strip of construction paper or a doubled piece of tissue paper. The latter may be cut in either the folded or the open edge. Cut fringes about a quarter of an inch wide and deep enough



FRINGED TREE

to leave about a quarter-inch margin uncut. Now dip a stick or twig in paste and begin winding the cut paper around the top of the stick. Arrange the fullness to give the appearance of a tree, winding the paper down the stem until the desired amount has been put on. This tree may be set into a spool, into a bit of clay or plasteline, or into sand ; it is especially usable, for it may be put away and used again and again.

Various special trees may be imitated by finding suggestive twigs or branches of real bushes and pasting things on them. A flowering tree of Japan or a blossoming fruit tree may be imitated by pasting or threading tiny specks of pink and white tissue paper along the

PAPER-CUTTING AND PAPER CONSTRUCTION

twigs. Some evergreen trees may be imitated by coloring sponges or cotton a dark-green shade and pasting tufts of this material to the ends of suitably shaped branches.

A paper tree, suitable for Christmas decoration or some other special decorative purpose, may be made either individually or as a group enterprise. For a tree about a foot high and about six inches in diameter, cut five sheets of plain green tissue paper into as many six-inch circles as they will yield. Now scallop the edges of these circles slightly, then take each circle and fold it over and over until it makes a sector about an inch across at the wide end. Put a stout but soft thread into a needle, and thread it through the folded point of each of the many sectors made from the circles. When they are all on the thread, pull the thread tight and tie. Now put the fingers into each sector and fluff each apart. The result is a large, full ball. Tiny red dots may be pasted on some of the edges for decoration. To mount the tree, cover a piece of dowel with brown paper or get a good twig from a real tree. Dip the end of the stem into paste, and stick it up into the tree. The tree may be set into a little pot or tub filled with sand.

Costuming and special days. The use of paper in costuming was discussed in the chapter on "Sewing."¹ For some suggestions for favors to be made in connection with holidays and special days turn to Chapter X.²

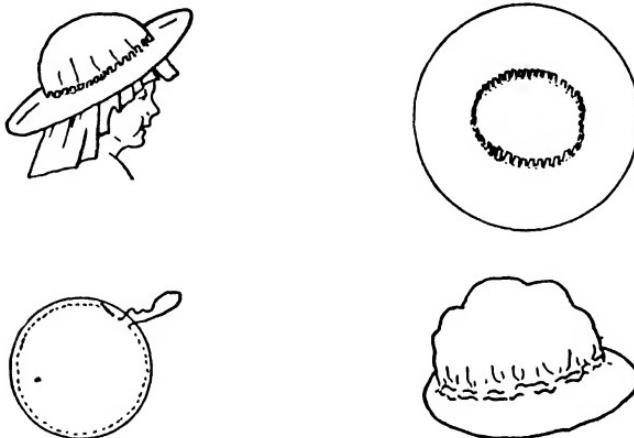
Hats. Newspaper makes good foundation material for the Halloween or other hats that children make for themselves to wear, and different kinds of tissue paper are used to carry out the ideas further. The hats to be described here may be used for children or for dolls to wear. It may be urged that in making them for dolls we are violating our principle of using real instead of imi-

¹ See page 53.

² See pages 244 ff.

EDUCATION THROUGH MANUAL ACTIVITIES

tative material, and the objection is well founded. However, there seems to be a definite degree of interest and value derived from the combination of paper materials into hats, and our limitations would be very great both in materials and in execution if the real materials of hat-making were to be used. Construction paper may be



HAT-MAKING

First, little child's method of making a hat crown; *second*, the hat brim; *third*, gathering a circle for a tam crown; *fourth*, crown attached to brim

used for hats, with under facings of the beautiful soft-toned thin paper. Tissue papers are much used, and cheap paper napkins make soft, neat linings. Hats may be put together with paste, tape, pins, or sewing.

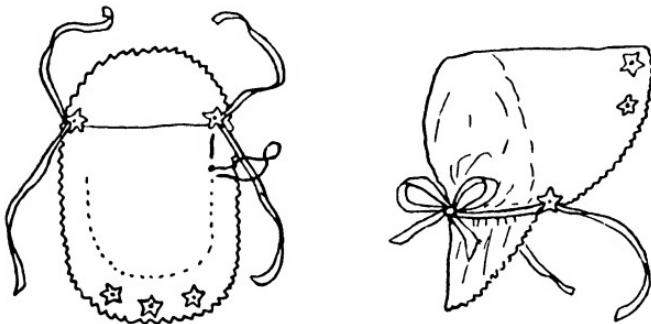
Tailored hats of more formal type are made with the round formation¹ discussed under "Some Fundamental Folds." This will be the crown. The brim may be a circle of construction paper with the head size marked where desired. Cut the center of the circle out half an inch inside this head size, cut small fringes into this margin

¹ See page 147.

PAPER-CUTTING AND PAPER CONSTRUCTION

up to the head size, and turn up these fringes. The crown is slipped over this brim and is pasted to the fringes inside the crown.

Brims may be varied by cutting through and lapping to get a drooped rather than a flat effect. Instead of a round brim, it may be oval. To make a poke shape, place the head size nearer the back than the front of the brim, and lap the brim in the back. Doilies of lace paper



SUNBONNET SPREAD OUT, AND THE BONNET MADE UP

make pretty brims for some hats, and pleated tissue paper does also. The paper may be cut like eyelet embroidery.

Crowns may be made in more informal shapes than the one mentioned above. A crown may be made of a circle of soft paper gathered around the edge like a tam. Another kind of crown is made in quarters or sectors and the edges pasted together to look like a sport hat. Still another is a band that fits around the head, with a circle of soft paper pasted into the top.

Sunbonnets may be made quite easily of cloth or paper. Cut a semicircle of Manila tag for a cloth bonnet, or one of any foundation paper for a paper bonnet. This is the stiff piece around the face. Now cut a piece of material the same size as the stiffening and paste to the foundation

EDUCATION THROUGH MANUAL ACTIVITIES

for the lining. Now cut an elliptical or oval piece of the material, one end of which fits the foundation stiffening, and paste it on the other side. You now have a piece of stiffening with a piece of material covering one side, and a much longer piece covering the other side and hanging down below it. Arch the stiffening around the face of the doll or child and arrange the other end of the ellipse around the neck. The edges of the bonnet may be clipped in tiny scallops, stiffening and all, or buttonholed. Decorations of strings, rosettes, or designs may be added.

A tiny baby's bonnet may be made by cutting a circlet of lace paper for the back of the head and gathering around it a piece of paper napkin or tissue paper. Leave a bit of the circle untouched for the back of the neck. Now gather the ends of the strip around the face, and add strings and frills.

Children will enjoy arranging their hats in millinery displays, and there is good material for thought in such arrangements. The children may make standards to hold the hats by sinking sticks into clay bases, or they may make holders by twisting paper circles into cones and pinning. Pretty boxes for hats may be made according to the fundamental folds described,¹ and these boxes may be decorated as fancy hat boxes in millinery stores are decorated.

Embroidery on hats may be done with yarn, raffia, or crayon. Colored paper may be appliquéd on, or the paper may be cut to look like openwork. Tissue paper is made into pleatings and other decorations, and silver paper or tinfoil can be fashioned into bunches of metal berries. Natural objects, such as feathers, grasses, and berries, may also be used to trim hats. Quills may be imitated in paper by pasting a thin rib of construction paper down

¹ See pages 144 ff.

PAPER-CUTTING AND PAPER CONSTRUCTION

the center of a paper quill, and cutting the edges of the paper slightly. Other kinds of trimming, such as paper flowers, will be described in the next paragraph.

Some useful paper decorations. Paper flowers may be made without paste. To make a simple daisy, take two little squares of white tissue paper, fold into sectors, scallop into deep, thin petals, and open. Twist a long, thin piece of green tissue paper tightly between thumb and finger for a stem. Cut a tiny spot of yellow for a center. To assemble the parts of the daisy, arrange the two pointed white pieces, put in the center, and punch through all three centers with a sharp point of the scissors. Tie a knot in one end of the twisted stem, and put the other end through the hole. Pull up and crush the flower slightly. Other flowers may be made in this way by varying color and shape.

A sweet pea is made by taking two small circles of tissue paper, one white and one pink. Make each into a little round puff by gathering up the edges. Wrap one end of a thin strip of green tissue paper around the edges of both puffs as they are held close together. Twist the remainder of the strip into a stem.

Fluted or bell-shaped flowers may be made by folding a strip of crêpe paper lengthwise. Begin rolling the strip with the cut edges forming the center of the flower and the folded edge forming the petals. Pull this folded edge slightly to make it fluted or bell-shaped as you hold the inner edges tightly together. When the shape wished for has been made, cut the paper and fasten the flower with paste. If desired, the strip of paper may be rolled more tightly, in spiral fashion, making a different kind of flower, more like a button.

To imitate chrysanthemums or other flowers of the fringed variety, cut thin fringes into a strip of paper and

EDUCATION THROUGH MANUAL ACTIVITIES

curl them with the scissors or a hatpin ; then fashion the strip to look like the flower.

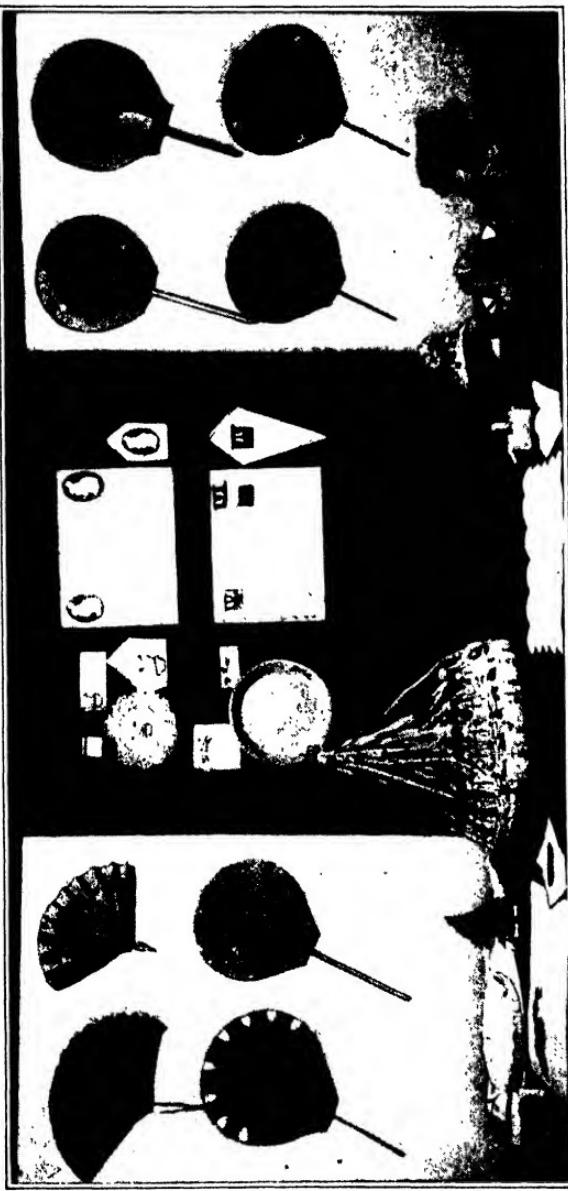
A length of tissue or crêpe paper about an inch wide may be twisted into rope and appliquéd in designs on costumes or other things very effectively. Buttons and scrolls are made in this way.

Fans. Fans are much in evidence on the first warm days, and children may utilize their desire to keep cool by making really pretty fans. One kind is the pleated fan which may be made of wrapping-paper or large sheets of bogus paper. Colored motifs may be cut out for decoration, or blended water-color washes may be used. A pretty cord may hang from the fan.

A variation of the pleated fan is this : Pleat a long strip about four inches wide, the pleats running the narrow way of the paper. Fasten each of the short ends to sticks for handles. Then gather all the pleats at one side into a center, and fasten securely. This fan opens and closes.

A third type of fan is the flat fan in any pleasing shape. A thin stick, such as an enlarged kindergarten stick, makes a good handle. Cut the desired shape from two pieces of Manila tag and fasten the stick between these pieces of tag with thumb tacks, so that the handle goes well up into the fan to make a good support. Now the fan may be covered on both sides with paper of some pretty neutral color, and then decorated with a colored picture or with a design cut out of colored paper. The edges of one side of the cover paper may be turned over the edge of the Manila tag and pasted, and the other cover piece may just cover the other side of the fan and the pasted-down edges. Still another way to take care of the edges is to cut both pieces of cover paper to fit the fan and paste them on. Then cut some colored paper into decorative motifs that may be clamped over the edges of

FANS, PARTY DECORATIONS, AND HATS MADE OF PAPER



EDUCATION THROUGH MANUAL ACTIVITIES

the fan at intervals, serving both as a means of holding the edges and as decoration. This method is best for the younger children.

Wind toys. These have only temporary use but seem legitimate since they offer opportunity to play with the wind. Real kites are described elsewhere.¹ To make a small imitation kite, fold a square of construction paper diagonally, and open. Place the paper in front of you so that the crease runs from front to back, and fold the two edges nearest you until they meet the crease throughout their length. This will make a kite-shaped fold. The children may attach a tail made of bits of colored paper tied to a string, and a string for holding the kite may be fastened to the place where the upper corners of the folded edges meet. This may be held together with a piece of tape or pasted paper.

A simple pin wheel or windmill is made of a square of paper, folded both ways diagonally, and opened. There will be two creases crossing at the center. Cut from each corner along these creases until the center is almost reached. With a pin catch up every alternate point of paper and, finally putting the pin down through the center of the paper, attach it firmly to the end of a stick or twig. The wheel should spin freely when the child runs with it. Care must be used to pin the points of the wheel to lie flat and not turn up.

Party decorations. Centerpieces, place cards, napkins, decorated paper plates, and little baskets are among the various things that may be made for the decoration of tables or desks for children's parties. These things offer splendid problems for children, provided they are allowed to solve them. Plate doilies are made by folding soft paper napkins or towel paper into sectors, cutting

¹ See pages 181-182.

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the scallops all at once by cutting this folded paper across the wide end, and then decorating the scallops with stick printing, crayon, or cut-out designs.

Little boxes or baskets may be made by experimenting with the various fundamental folds.¹ They may be made of construction paper or of tissue paper, and may be ornamented with some of the many forms of decoration that have been mentioned. If baskets are to be lifted, string or yarn handles are better than paper.

Place cards may be made to hang on the tumbler or to stand up on little standards or to lie beside the plate. Sometimes a favor takes the place of the card. A simple artificial flower set into a clay base is an example. Children easily make simple imitations of jonquils and daisies.

In one school the children were to have parties at which the bread and butter they had made would be served. They were divided into groups, and each group chose a rime to be represented in its table decorations for the party. One group of young children chose "Chanticleer." This they represented by a peanut with tissue-paper feathers. He was set on a fence made of sticks set into clay posts, and this, with a bit of tissue-paper shrubbery, formed the centerpiece. The children cut plain yellow circles, representing the rising sun, to lay under their plates. They made candle-holders by sticking candles into paint pans filled with sand. Paper circles slipped over the candles hid the sand and pans.

Another group chose a snowflake rime, and made their centerpiece a garden bed by sticking small bits of colored crêpe paper into a shallow cardboard box covered with green tissue paper. Christmas snow was sprinkled over the bed, as the rime indicated. The plate doilies were made of white paper folded over and over and cut into

¹ See pages 144 ff.

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surprise snowflakes. The table was covered with pale-blue wrapping-paper to make the snowflakes show up. The napkins were fringed.

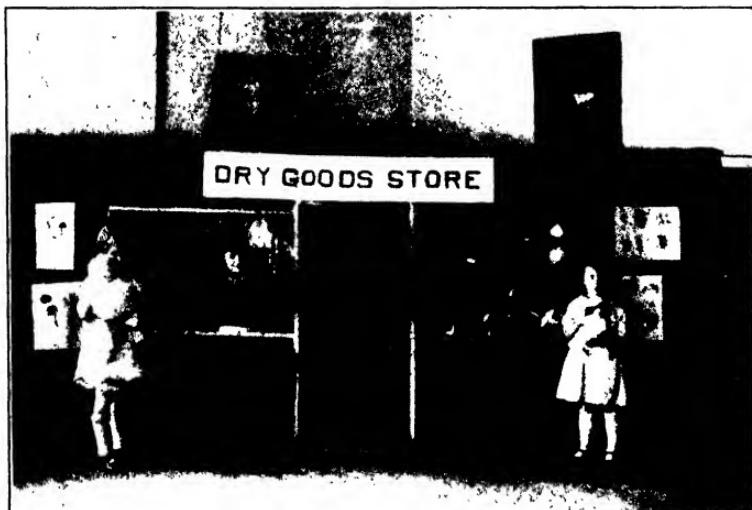
"Mistress Mary" was chosen by one group. Mistress Mary was a doll dressed in pink paper. She walked on a garden path made by sprinkling a little sand along the center of a piece of green tissue paper. On either hand grew hollyhocks made by attaching small fluted rounds of crêpe paper to thin sticks for stems. The candle-holders were scalloped rounds of dainty colored tissue paper slipped down over Christmas candles sunk into small lumps of clay. The plate doilies were scalloped tissue-paper doilies of the colors seen in hollyhocks. The napkins were scalloped and had a tiny flowerlike form pasted in one corner.

A pretty centerpiece that children may make to set on the table or on the teacher's desk is made by covering a man's round hat-box cover with crêpe paper. For a party to celebrate springtime or May Day the scheme may be pink and white. Fold a long strip of white paper into sections and cut from it a repeat cutting of a child with both hands outstretched. The pattern for the child may be taken from any fashion book. Make enough little girls attached together to go all around the edge of the box. Now cover a thin dowel or stick with pink crêpe paper and set it up in the center, poking it through the middle of the box cover, so that it will rest on the table. Tiny streamers of pink paper are cut and fastened to the top of the pole, while the ends are made to rest lightly between each pair of hands as the children dance around the pole. Attach the children by pasting the feet around the outside of the cover rim. This same idea may be used at Halloween by substituting brownies for the children, and a witch or black cat on a pole for the center.

PAPER-CUTTING AND PAPER CONSTRUCTION

Orange and black would be attractive colors for this centerpiece. The brownies may be silhouette figures.

The dry-goods store. Many things made of paper are interesting to use in playing store. Even though cloth is used for selling or make-believe, paper things may be had in larger quantity than is possible in truer materials.



KINDERGARTEN STORE

Children, besides making hats, fans, dolls' dresses, and little sprigs of crudely made paper flowers, also make doilies, paper handkerchiefs, paper headbands, and collars and cuffs. These may be made of paper toweling and ornamented with stick printing or other decoration.

MATERIALS USED IN PAPER-CUTTING AND CONSTRUCTION

Scissors. The need for sharp scissors was pointed out in Chapter II. School-supply catalogues offer a variety of scissors. A good quality is usually the best economy.

EDUCATION THROUGH MANUAL ACTIVITIES

Papers. For paper-cutting and experimentation in construction a very cheap grade of typewriter paper may be had. Plain Manila is useful, but somewhat stiffer. Very often schools buy certain kinds of paper in large quantities, hence the free use of it would be influenced by the supply on hand. Newspaper is a possibility where the print does not interfere. Wrapping-paper or unprinted newsprint is better and usually may be obtained locally. Paper fluctuates in price, and what should be bought depends upon the market.

Colored paper may be had in sizes varying from six by nine inches up to very large sheets; medium sheets, twelve by eighteen inches in size, are very convenient. Thin colored paper for covering and decorating now comes in many beautiful tints and shades. The heavier colored paper for construction also comes in many colors. It is best to send to some school-supply house for sample books and to order from these by number.

Plain tissue paper and crêpe paper should be purchased locally to avoid mutilation in sending. Towel paper and paper napkins can serve many purposes and are not expensive.

Manila tag, a paper which is shiny, tough, but not very stiff, is good for charts and for making structures or foundations where some strength is needed. It comes in large sheets, about twenty-four by thirty-six inches in size. For stiffness but not for beauty, chipboard, which comes in sheets of twenty-two by twenty-eight inches, is useful. It cannot be folded, but is good for support and strength. Mounting boards are to be had in different qualities and colors, and samples of them may be obtained by request.

Leatherette papers, silver and gold papers, and other special papers are useful for many particular purposes

PAPER-CUTTING AND PAPER CONSTRUCTION

and may be ordered from samples furnished by any school-supply house. Sometimes the kind of wall paper called oatmeal paper may be used for charts if soft, colored chalk is to be used for decoration. This wall paper may be cut in pieces longer than any other sheet of paper obtainable.

PASTE AND FASTENING MATERIALS

Paste is usually purchased in large quantities by schools. For ordinary pasting there is white library paste; there is also a more adhesive paste, with some glue in it, which may be had in jars or tubes. A very heavy furniture glue, to be used for wood and other heavy materials, may be bought in small cans at hardware stores. Some fine mounting pastes are on the market which would be valuable for special purposes. Samples may be obtained by request.

Recipe for homemade paste. Mix one scant cup of flour, one rounded tablespoon of powdered alum, and one cup of cold water. Blend this mixture and add a cup of boiling water. Cook slowly until semitransparent but not as clear as starch. Add a little oil of clove. This will keep a week.

How to keep paste. Some people use small china or glass jars for individual portions of paste. Cold-cream jars are useful for this. Others put a small amount of paste on a butter chip or a piece of paper or cardboard for each child. In the latter case the surplus paste is easily scraped off, and no washing of dishes is necessary. Library paste, when too stiff, may be whipped up with a spoon or thinned with a little water. Furniture glue is softened by setting the can into hot water.

Brushes. There are little bristle brushes for pasting, that may be bought from school-supply houses. If the pure white paste is allowed to dry on the brush, it can be

EDUCATION THROUGH MANUAL ACTIVITIES

shaken out as powder without washing ; but if the paste with glue in it is used, the brush must be washed. A substitute for a paste brush is a flat stick, such as a piece of a berry box, or a paster may be made by folding a piece of paper over and over.

Habits taught through pasting. Children should learn to avoid wasting paste, to return unused portions to the jar, and to keep the jar covered. They should be taught how to apply paste : to distribute it evenly, only where needed, and to put it on sparingly. They should be shown the need for keeping a picture to be pasted away from the mount while applying paste ; also they should be taught to keep their fingers free from paste and to use a sheet of clean paper and a cloth to press the mount and absorb surplus paste. Children may be taught good pasting habits very early.

Substitutes for paste. Many times other ways of fastening or holding paper together are preferable to the use of paste, because of the greater strength of other materials and the added ease in their use. A fine asset to the teacher's stock of materials is gummed paper tape such as is widely used by merchants and druggists for fastening packages. A large roll may be bought at small expense. Often a small piece of this is much more easily applied and holds more securely than paste would. Gummed cloth tapes are used more sparingly, as the cloth is expensive and is not needed in many cases. Pins and brass fasteners are indispensable. Sometimes sewing a paper article is more sensible than pasting it.

Little fingers have often found pasting difficult, and often we have asked children to paste things that were too heavy to be held together in that way, or which were too difficult to handle. A little thought about other means of holding paper together may benefit teacher and child.

PAPER-CUTTING AND PAPER CONSTRUCTION

THE HECTOGRAPH

The teacher often needs to reproduce reading material for children. In connection with handwork many very interesting reading lessons might be worked out by the teacher and reproduced on the hectograph. Thus she could give the children needed directions or desirable information concerning their various projects. The hectograph may be any shallow tin pan with a cover to keep the dust out. Regular hectograph ink may be purchased.

Recipe for hectograph filler. Take two ounces of French gelatin, half a pint of water, an ounce of sugar, and a pound of glycerin. Put all into a double boiler and cook until well mixed. Stir gently. Strain through an old piece of dampened cheesecloth into a shallow pan. Set it level and free from dust for twenty-four hours before using.

CHAPTER VII

MAKING USE OF ODDS AND ENDS

Many things saved from the scrap heap or found here and there may be utilized in the making of toys and gifts. It therefore seems profitable to have a discussion of odds and ends as materials for handwork, even though this may somewhat overlap the previous discussions of wood, cloth, and paper.

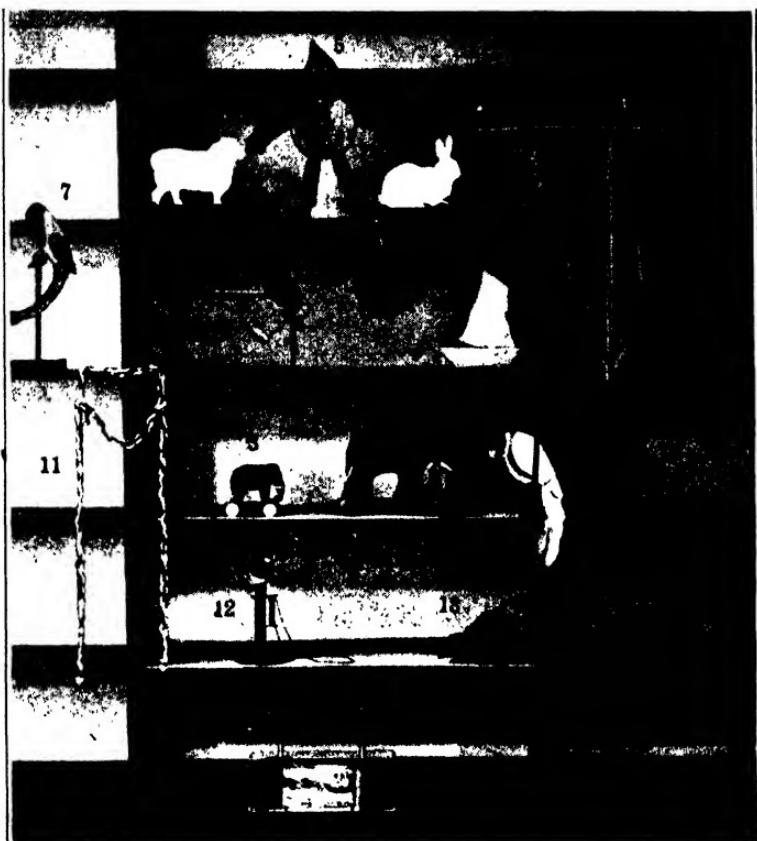
One advantage in using scrap material is that articles may be made with very slight expense; and if really good ideas are worked out, there surely is value in using material otherwise useless. The joy of discovery and the satisfaction derived from "adapting means to ends in problematic situations" are worth fostering in this age of too many ready-made adjustments.

Care must be exercised that good standards be kept in mind. Things made must be as durable, as usable, and as artistic as possible. There must be good problems to solve in the making of these articles, for there is no virtue in using odds and ends just to use them up, or to make flimsy, useless, or foolish things.

MATERIALS

It is well to have children collect odds and ends of material, and to have the general idea that there may be a use for these things. To that end a box or other place may be provided into which children may put such articles

MAKING USE OF ODDS AND ENDS



TOYS MADE OF WOOD AND ODDS AND ENDS

1, 2, 3, 4, wooden animal cut-outs (see Chapter IV); 5, wooden string puller (see Chapter IV); 6, kite; 7, swinging parrot (see Chapter IV); 8, tumbling toy (see Chapter IV); 9, tambourine; 10, butter-dish boat; 11, horse reins; 12, telephone; 13, floor rattle; 14, small moving picture (see Chapter VIII)

as cardboard boxes; mailing tubes; ribbon bolts; film rolls; spools; cigar boxes and other containers; pieces of tin, leather, wire, and cloth; also parts of broken furniture, and any other suggestive scraps. Sometimes we first get an idea and look into the scrap box for suggestions

EDUCATION THROUGH MANUAL ACTIVITIES

with which to carry it out; again we get a suggestion for something to make by looking at some odd scrap and seeing a resemblance to some toy or other article. Problems arise in both ways. In order to carry out ideas successfully with such materials, there should be on hand some staple supplies, such as glue, wire, nails, brass fasteners, colored papers, sticks, and cloth. Many of these articles, such as tenpins or picture puzzles, must be inclosed in boxes, and the cardboard box chosen should be attractively covered and decorated with a cut-out design or with colored pictures.

It may again be suggested that the paper from cigar boxes is best removed by dabbing with warm water and vinegar, rather than by scratching it off with a knife.

SOME MUSICAL INSTRUMENTS¹

In connection with primary-school music it is often desirable to make instruments to play upon. This interests children in how music is produced. When it is too expensive to give all the children something better to play on, usable instruments may in this way be provided with which the children can accompany selections played on the piano.

Percussion instruments. Blocks of wood may be smoothed for clapping together or, covered with sandpaper, may be rubbed together to give a shuffling sound. Dry gourds or small boxes may be filled with loose shot for rattling sounds. Drums may be made of empty boxes. One such is made of a round wooden box in which a large cheese comes. Take off the cover, and put over the opening a piece of tough cloth shellacked, or heavy cardboard, or sheepskin if it can be afforded. A discarded drumhead

¹ See Appendix F, V.

MAKING USE OF ODDS AND ENDS

may be purchased. This covering is stretched taut and tacked all around. The drumsticks are whittled, or a mallet may be made of a small ball of clay or wood attached to a stick. A description of a third-grade project in making Indian drums will be found in a later chapter.¹ Tambourines are made by stretching muslin taut between cheap embroidery hoops and tacking. Shellac the cloth after it is so stretched. Then, with wire, add to the hoops some bells from cast-off toys. Chimes on which to play tunes may be made at small cost by cutting brass pipe into lengths that give proper tones. The tuning must be done by experimenting. The pieces may then be suspended and struck. Xylophones may be made by arranging pieces of hard wood, cut in graduated lengths, on a tape or on two strips of wire or thin wood.

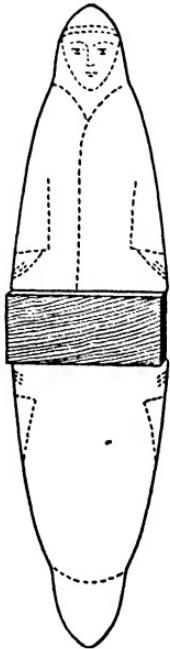
Stringed instruments. Various stringed instruments are made by stretching thin wire or gut over uncovered boxes or over boxes with openings cut in the covers. A simple one was made by kindergarten children by stretching spool wire across the open side of a shallow cigar box, winding the ends and loops of wire around tacks driven at regular intervals into the short ends of the box. The teacher had to help in pulling the strings taut. This instrument gave a background of thrumming for a negro lullaby which the children had learned. It does not give definite pitch. A more interesting instrument, like a banjo, is made from a cigar box about two or three inches deep. Leave the cover on and cut a hole in its center. Attach a handle to one short end of the box. At the end of this handle put in some crosspieces of thin dowel for keys upon which to wind the wires. On the other end of the box some nails may be driven into a small block of wood. The block raises the strings away from the box.

¹ See page 330.

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A crude harp may be made of the round wooden lid of a cheese box. Cut this lid in two so that one section is larger than the other, and work with the larger piece. Remove almost all of the flat cover piece, leaving only

enough to hold the harp together firmly. Connect the two ends of the hoop with a crosspiece of wood, to make the thing firmer. You now have a crescent-shaped harp, with the small end of the arc covered with wood, and the loose ends of the spread of the arc connected by a support. Wires are strung across the opening, fastened to the curved sides by means of tacks.



TENPIN SPREAD
OUT

GAMES

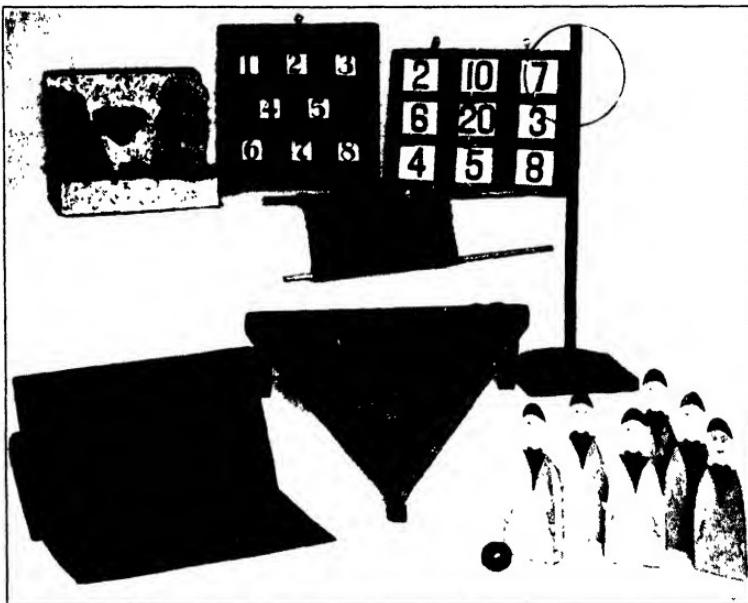
Picture puzzle. Find a suitable colored picture, and paste it securely to a piece of chipboard or other stiff cardboard. When dry slice it in a paper cutter into varying shapes. Decorate a box to hold the puzzle. If desired, the picture may be shellacked before it is cut up.

Tenpins. Find a suitable design, such as a soldier, sailor, dog sitting up, brownie, or other figure not too spreading. Make each tenpin as follows: Cut the pin out of Manila tag, double, with a connecting piece an inch wide at the foot between the front and the back figure. When folded, this one-inch center serves as the base, or part that rests on the floor. Cut a little block of wood to fit into this floor-rest as the pin stands up. The tips or tops of the figures may be lightly fastened together with a bit of glued tape put in on the inside. Decorate the tenpins with cut-out paper or

MAKING USE OF ODDS AND ENDS

crayons, inclose them in a box, and add a ball made of clay. Stand the pins up on the floor and roll the ball to push the pins over. Various scores are worked out arithmetically.

Checkerboard. Cut a piece of cardboard the size desired for the checkerboard. If a folding board is wanted, the



SOME GAMES WORTH OWNING

board should be cut in half and hinged with adhesive or gummed tape. Cover the board inside and outside with one color of paper, preferably black. Now divide the front of the board into the proper number of squares, sixty-four in all, and paste squares of orange paper over the black to make the checks. Bind the outside edges of the board with gummed paper tape such as is used for passe partout. Cloth tape may be used, but it is more expensive. The checker men may be made by gluing together

EDUCATION THROUGH MANUAL ACTIVITIES

rounds of cardboard and covering twelve with black and twelve with orange paper circles. These men should be inclosed in a little box, which may be decorated with checks. Other ways of making checker men may be devised. Clay may be rolled out thin and the men cut out with a tiny tin cover. Button molds or other commercial articles may be used, but usually they cost too much.

Bean-bag game. Nail three coffee cans close together at the center of a platform, such as a cheese-box cover or the wooden slatted cover that comes on bushel baskets. The foundation may be painted black, and each can may be painted a different color. A bean bag is made, to be thrown into the cans. Scores may be kept as devised by the teacher.

Toys

Cloth picture book. Fold cambric into several double leaves. Clip or scallop the edges to keep them from raveling. Sew the book together by stitching it on the machine down the center of the opened leaves as the whole book lies open, one leaf inside the other. A needle and cord may be used to tie the book if a machine is not available. Colored pictures from advertisements are pasted into the book in attractive arrangement. Sometimes bookbinding cloth or old window shades may be made into picture books of a stronger type.

Horse reins. Cotton roving may be braided or twisted into reins. Measure from the back of a child's neck, passing around to the front, down around the armpits, and out behind, as far as the reins are to extend, to the driver. To twist, cut two pieces of cotton roving in two different colors, each piece being two and a half times the finished length of the reins. Usually the reins are about two yards long, so that each piece needs to be five yards

MAKING USE OF ODDS AND ENDS

long. Tie the ends of the two colors together at each end. Two children work together, sitting in chairs at opposite ends of a small room. Each child holds an end of the two-strand arrangement, and turns the knot over and over toward the right. When the whole length has been twisted very tightly, but not so that it bunches, the teacher or one child takes the twisted length by the two knotted ends, stands high on a chair and allows the rein to hang free as he lifts it up. The two twists will "jump" into a four-strand, tightly twisted cord. The knotted ends may be tied together at the back for the driver to grasp. Then twist a short piece to go across the front of the child's chest. The long rope may be passed through the twisted loop at one end of the short strap; and if the other end of the short piece is knotted, a loop will be formed there through which to pass the long rope. Thus the chest strap may ride up and down on the long rope and adjust itself to the child who wears it. Small bells are sewed across the strap if desired. If one child works alone to make the reins, he may attach one end of the material to a door knob while he twists the other end, or he may tack one end to a box or board to hold it in place.¹

Furniture. Almost any piece of furniture for a doll house may be made by combining cardboard boxes, either whole or in parts, with brass fasteners and glue. Spools are useful for supports. Odds and ends of wood or cigar boxes may also be made over into furniture.

Over-stuffed furniture is very attractive. For a davenport find three small cardboard boxes, or parts of boxes, whose height and combined length are suitable for a davenport. Pad the top of each box or part with cotton, and cover the padding with a piece of cretonne or old velvet or other upholstery material. Glue down the edges

¹See illustration on page 169.

EDUCATION THROUGH MANUAL ACTIVITIES

of the cloth. When the three pieces are thus padded, put them together underneath with brass fasteners. For the back and sides of the davenport cut curved pieces of cardboard, pad them, and cover with cloth, then attach these with more fasteners, working underneath. When the whole is securely made, the edges may be covered with pieces of cloth glued on. Sometimes the whole is set into a cardboard box lid which has been covered. This gives considerable firmness. The children may make a set of parlor furniture to match, using this same method.

Bassinet or cradle. A cylindrical oatmeal box may be made into a bassinet or cradle. Leave one end of the box whole, and leave as much of the box near it as is needed to form a canopy. Cut away enough of the remainder of the box to allow a doll to lie comfortably in the box. The box cradle may roll from side to side on itself or, if there seems to be danger of its rolling over, short, thin strips of wood may be tacked across both the round ends of the cradle near the floor and extending a little over the edges of the box. The box may be dressed with cloth to make it comfortable and pretty.

A candy box may be made into a bassinet by fastening against its ends two cardboard uprights, or into a cradle by adding rockers. Baskets or boxes may also be swung between uprights sunk into wooden stands, as described in the chapter on "Woodworking."¹

Vehicles. A combination of cardboard boxes may result in a vehicle. The wheels may be milk-bottle tops, oyster-carton covers, or tin covers. These are put on with brass fasteners so that they will turn easily.

Engine. Find an oyster carton or other container that looks like the boiler of an engine. In the case of the oiled-paper oyster carton take off the cover, and fasten the box

¹ See page 108.

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to a wooden foundation by means of brass fasteners put through holes bored in the wood. The wood may be pointed at the front to look more like the engine. Then find a cardboard box that will look like an engineer's cab when set against the rear of the boiler. Cut windows in it and fasten this cab to the cover of the round carton. Then slip the cover back over the box, perhaps putting a bit of glue under the cover. If necessary, fasten the cab down to the wooden foundation so that the whole structure will be braced and firm. Add four small button molds to the wooden foundation for wheels. Film rolls or spools are glued on for smokestacks, and other imitative features may be added. One child hung an old thimble on a nail for a bell, with a string that went back into the engineer's cab, and another child glued a small shiny button to the front of the engine for a searchlight. Paint the engine black.

Butter-dish boat. This is made of the wooden dishes in which meat, lard, and pickles are frequently sold. Find a thin dowel or other stick for a mast, and wrap around it a triangular piece of cloth for a sail, trimming to proper shape. Glue a spool to the bottom of the inside of the butter dish, and set the mast with its sail into the spool. The end of the sail may be attached with cord to the wire that fastens the boat together at one of its ends. The outside of the boat should be painted, and a string should be added for pulling. (See illustration on page 169.)

Toy box. This is made to hold the toys of a young child. A large round cheese box is good for the purpose. Smooth it as well as possible. Decorate by pasting cut-out pictures on it, and then shellac the whole; or first paint the box in some good color and then paint in silhouette the figures of animals walking around the edge of the box. Strong outline may be used instead of mass. The box may be lined with colored cloth either to match or to contrast

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prettily with the outside of the box, and casters may be added if desired. A square box may also be fitted up similarly. In the same way a waste box may be decorated for the school or nursery.

Sewing box. A cigar box, a basket, or other container may be covered or lined, and fitted with pincushions, pockets, and loops for holding sewing materials and equipment. A small strip of wood may have a few nails for holding spools and a small hole for the thimble. This strip may be fitted into the bottom of the box. There are many variations of this idea that may be attractively carried out.¹

Suit cases and trunks. Use cardboard boxes of suitable proportions. Boxes with trays, such as candy boxes, are good for trunks, and may be lined with handsome thin paper. Little pockets of paper may be added. The outside of the trunk and of the suit case may be covered with any construction paper of right color. Leatherette paper is especially good, as it imitates leather. The edges may be bound in paper tape that looks well with the cover material. Brass fasteners hinge the box parts together. The handle may be a strip of paper folded over and over for strength, and fastened on with brass fasteners. A wardrobe trunk is interesting to make, with cardboard hangers and other accessories. To make a closing or clasp for the suit case or trunk, a loop of cord or tape is fastened on and hooked around the head of a brass fastener.

Floor rattle. Take a coffee can and put some little pebbles into it to make a rattling sound. One way to make the handle is this: With a can-opener cut a hole in each end of the can and pass a dowel stick through the can. The can is to revolve easily on the stick. In order to fasten a handle to the rattle, attach to the ends of the dowel two

¹ See page 169.

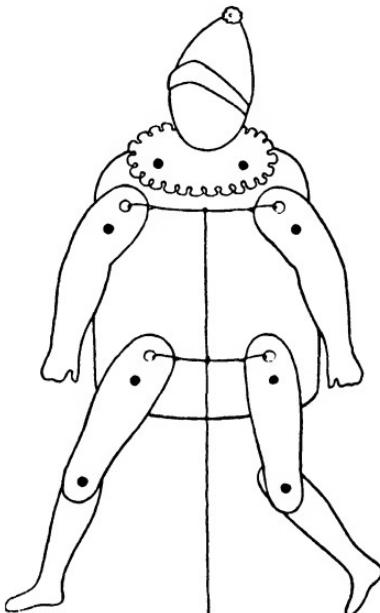
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short, square sticks perhaps six inches long. Now cut a stick as long as the dowel and nail it to the ends of these short sticks, making in all a rectangle with the coffee can at one side over the dowel. A long handle may be nailed to the other side of the rectangle, so that a little child may push or pull the rattle on the floor or sidewalk.¹

Toy telephone. Find a piece of broom handle or heavy dowel about the height of a desk telephone. Sink it into a round wooden base. Slant the top of the dowel off, nail against this slanting surface a tin cover, and nail to that a spool or other cast-off article that resembles a mouthpiece. The receiver may be a film roll attached by a cord and hung upon two nails driven into the upright.¹

String pullers. A good clown, brownie, or other similar figure may be made

into a string puller or jumping-jack by separating the arms and legs from the body. Cut all the parts of the clown out of chipboard, and paste colored paper over them to show costume decoration. Ink may be used to paint features on the face, or features may be pasted on. With a punch, make holes in the body end of each arm and leg. To these holes are fastened the strings, one string to hold the arms together, one string to hold the



STRING-PULLER MECHANISM

¹ See illustration on page 169.

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legs together, and a long string that connects the arm string with the leg string and hangs below to pull by. Fasten the arms and legs to the body by means of brass fasteners so that the joints can be moved very easily. When the string is pulled, the arms and legs should move freely and high up. A small loop through the top of the cap is good to hold the toy by. (See illustration on page 169.)

Top. Take a thin flat ribbon bolt, cork, or wooden circle. Find and mark the center of the circle on both sides. Cut a short length of dowel of about pencil thickness, sharpen in the pencil-sharpener, and put through the flat bolt so that it is tight. Tape may be used to make it tighter if necessary. The smoothness with which the top spins depends upon the length of the point, the length of the stick, and the tightness of the stick. The top may be decorated with sectors of colored paper or other design cut out of paper.

Jack-in-the-box. Find a cigar box or other box as deep as it is wide and long. Now get from a furniture dealer or from a junk heap or from an attic a bed spring or a wire coil from a chair. Any strong spiral spring will do. Make a grotesque head of old stocking, mount it on the top of the spring, and arrange a skirt to cover the spring. If, when the spring and figure are tried in the box, it is found that the cover fits down too easily to prevent the spring from springing when the box is opened, place a board under the spring and nail the spring to it; then nail the board to the bottom of the box. A closing for the box is quite a problem. A small hook and eye may be put on if the side and cover of the box are thick enough to allow them to be attached firmly. If the box seems to admit of nothing else, a reënforcement may be put inside, to which the hardware may be nailed.

Humpty Dumpty. Find a ribbon bolt about three inches in diameter and about five inches long. Part of a mailing

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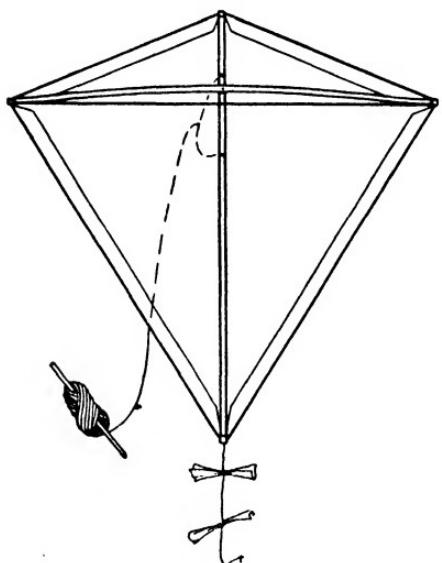
tube would do. Remove the ends of the bolt. Now take a piece of cloth as wide as the circumference of the bolt and several inches longer than its length. Wrap it around the bolt, gather one end with thread and needle, and lap this gathered end over to look like the top of a cap. Mold a ball of clay about two inches in diameter; put it, when dry, into the tube, and pin the cloth over temporarily at the end where the ball was inserted. Try out the toy by setting an ironing board or other board against a chair or table to make an inclined plane. Start the toy at the top. It should turn over and over, end upon end, all the way down the board. If the toy rolls or skates, there is something wrong with the size of the ball. When this has been adjusted, fasten the other end of the cloth permanently. Now decorate the whole toy. A face may be drawn on the tube, and a tassel may be added to the gathered end of the cap. Other ideas may be used to make the Humpty Dumpty look like some grotesque figure.

Kite. A large sheet of thin wrapping-paper is needed, and two thin dowels or other sticks about two and a half feet long. Cross the first stick over the second through a staple or wire loop six inches from the top of the second stick. With this as a pattern, and allowing a one-inch margin all around, cut the wrapping-paper in the shape of a kite, with four points corresponding to the four ends of the sticks. Turn the paper down an inch all around but, before pasting it, run a cord through this doubled hem or casing, beginning at the lower point of the kite, going all around, and ending at the lower point again. The ends of this cord are pulled up tight and a knot tied.

Now pull the cord out to make a tiny loop at each point of the kite. Cut a little groove in each end of the sticks and slip the loops of cord over the grooves, thus fastening the kite to the frame. For the bow wire, take a piece of

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thin wire and make a loop in each end of it. When the kite is done, this bow wire, which is a bit shorter than the width of the kite, is fastened to the grooves in the cross stick, thus pulling the kite into a slightly convex shape. So far the construction has all been on one side of the kite.



THE KITE

Turn the kite over. Pass an eight-inch piece of cord through the paper about five inches from the top of the kite and fasten it to the vertical stick on the back. Now pass the other end of the short cord through the paper about five inches from the place where the first passing was made, and fasten the end to the other side. This cord will form a loop on the side of the kite that has no sticks, and to this loop is to be tied the ball

of string that is payed out as the kite is flown. If the kite needs a tail, it may be added. Large, brilliant cut-out motifs may be used for decoration on the kite itself.

Jumping rope. Find a discarded inner tube of an automobile tire of large size. Cut half-inch rings by slicing the tube crosswise. The rope is made by combining these rings until the desired length is reached. Hold a ring in each hand, and slip the right one through the left. As the ring emerges hold it; through it slip the other end of the same ring; then pull tight. Continue in this way to add

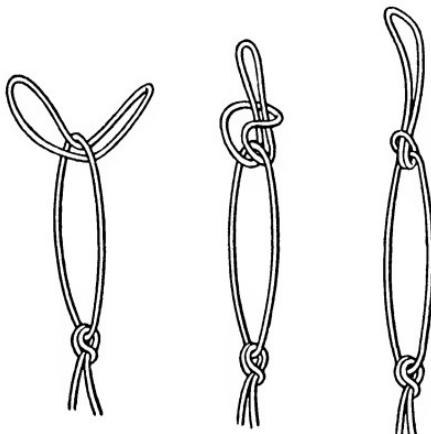
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to the length by attaching ring after ring to the part already made. Handles for the rope may be made by winding each end with a strip of cloth until it is comfortable to hold, or by poking the ends of the ropes into thin mailing tubes, pieces of broom handle with holes bored in the ends, or spools. The rope works nicely without handles.

Dolls. A paper bag may be made into a doll. Put a bit of cotton into the bottom of the bag and twist some string around the bag at that point to make a head. Put some more cotton in, and with string mark off the body. Pieces of bag may be folded over and over to make the arms. The opened top of the bag forms the skirt of the doll as she stands. She may be neatly dressed.

Clothespins may be dressed in cloth and paper. The head and feet of the pins may be built out with plasteline or plasticine.

Dolls are sometimes made of spools strung together.



STEPS IN THE KNOTTING OF A
JUMPING ROPE

GIFTS FOR MOTHER

Bird houses. These are often made of tin cans, empty coconut shells, hollow logs, or pieces of bark. They may be mounted on a board foundation. A can-opener is used to cut the opening for the house made of a tin can. Sharp edges must be pounded smooth.

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Basket for Christmas greens. A small berry basket, about six inches square, may be used. A tin-bound one, larger at the top than at the bottom, makes a pleasing shape. By intertwining two strands of heavy reed, make a tall, arching handle that completely encircles the basket. Insert the ends of this handle between the layers of the box bottom and tack them. A clay disk for the basket should be perforated with holes large enough to hold branches of Christmas greens, bittersweet, or other dry bouquets. The basket, the basket handle, and the clay disk should all be painted.

Dish mop. Take for a handle a suitable length of dowel. Cut white cotton roving or coarse string into lengths twice that of the finished brush of the mop. Lay all these lengths of roving in a straight pile or bunch, and slip the end of the dowel into the bunch just past the center of the lengths, and in the center of the thickness also. When this has been done, the handle will emerge a few inches out of the ends of the cords, and will be in the same direction as the cords. Now tie a thin wire around the whole mass, handle and all, just below the center of the strands, that is, a little closer to the ends of the cord on the side opposite the handle. If there is a tiny groove in the end of the dowel that is stuck into the mass of threads, it will be helpful when the wire is pulled tight and allowed to rest in this groove. Shake the brush so that the upper parts of the cords fall over the lower. Then tie a cord around the mass close to the handle to finish the dish mop.

Tray. This may be made for distributing materials, lunch, or other things. Use the wooden cover of a round cheese box. Sandpaper it smooth. Make a handle by attaching to the middle of each side the ends of a piece of barrel hoop which arches over the tray, or make some little side handles of several thicknesses of flat reed wound

MAKING USE OF ODDS AND ENDS

with raffia. These handles may be nailed to the tray. The tray may be painted in black enamel, and may be fitted with a black oilcloth doily which has been decorated with stick printing in enamel or with colored yarn or raffia stitches.

Candlesticks. To make these, get from a dry-goods store a pair of the tall, thin spools upon which narrow ribbon is wound. The spools should be of wood, but sometimes those having a cardboard core are usable. Glue each spool to a wooden circle of appropriate size. Now put into the hole at the top of each spool a soft-pine peg about an inch long. It must be pounded in firmly to fill the hole as well as possible, and should be even with the top of the spool. Now drive into these pegs very thin nails about an inch long. Cut the heads of the nails off with a wire-cutter. The candles are slightly warmed at the ends and gently pushed down over the thin nails.

NATURE MATERIALS

There are a great many materials that may be found in woods or fields, and these nature materials may be utilized by children in the making of articles of permanent or of temporary value. The connection of this kind of work with nature study and with studies of primitive life is of course evident, and special reference to the subject will be made in a later chapter.¹ The following suggestions have to do with miscellaneous uses for these nature materials.

Seeds, berries, and nuts may be perforated and strung into necklaces, bracelets, and chains to be worn. Care in the combination of color and form is necessary here. Knots in the cord make it possible to use fewer seeds with a better effect. Sometimes pale-colored seeds are tinted

¹ See Chapter IX.

EDUCATION THROUGH MANUAL ACTIVITIES

in pretty colors and used. Little clusters of seeds and berries are often used to trim dolls' hats.

Birch bark may be used to make canoes, wigwams, and baskets. It is easily sewed together. Children should be taught how to be careful of trees in taking off this bark.

Bark and sapling wood may be used to decorate bird houses, flower boxes, and baskets, for home and school decoration.

Furniture may be made by pinning thin twigs together in rustic style. A flat cork may often serve as a seat.

Peanuts, horse-chestnuts, and other nuts and vegetables may be made to look like animals, and may be used for parties, sand-table scenes, and the like. Pieces of paper, sticks, and wire may be pasted to these nuts for tails, ears, or legs. Potatoes are often made into animals, such as billy goats, for puppets. Gourds, shells, bones, and other suggestive materials are often used for making weapons and dishes in connection with primitive-life study.

Leaves, grasses, and flowers are useful in costuming. For nature study, booklets and collections of blue prints are interesting and profitable, and a photographer will give directions and sell materials.

For parties, ears of corn, apples, and carrots may be hollowed out to make candle-holders. Nature materials also suggest place cards. Nuts and vegetables may be dressed up, or little men may be constructed of combinations of these. A walnut may have a face drawn on it, may wear a pointed ruff and hat, and may then be glued down on a name card.

Dried fruit may be pinched to resemble the features of a brownie or of an Indian squaw. Feathers are useful for trimming Indian clothing.

Every locality has its own peculiar nature materials that may be utilized in the handwork of children.

CHAPTER VIII

ACTIVITIES INVOLVING MANY MATERIALS

In the previous chapters an attempt has been made to describe the materials most usable in the lower grades, and to suggest the possibilities of these materials, especially as they lend themselves to individual expression. In addition there are many activities involving the use of several materials and the organization of many ideas, which may be engaged in by individual children, but which quite definitely lend themselves to coöperative enterprise. The booklet, the chart, the sand table, the peep show, the moving picture, the exhibit, and the puppet play are all means by which certain kinds of investigation or thinking may be focused and visualized for the young child, who is still a sensory, rather than an intellectual, individual. These activities often clarify and motivate a piece of work or study, or record its progress. Organizing ideas in this concrete form should be considered of great importance because of the mental training involved, and hence the growth of the child cannot be judged by the finished sand table or peep show. In this type of activity the materials are mere vehicles, or means to an end.

A very important consideration in any kind of miniature or representation is that one must differentiate very carefully between a construction that aims to give only a general picture and one that aims to be true to actual materials and processes. For example, let us consider Eskimo life. If one wishes to show children a general

EDUCATION THROUGH MANUAL ACTIVITIES

picture of the Eskimo country and life, it will be legitimate to make the snow of cotton, the houses of paper and cotton, and to imitate other features. But if one is trying to show the problems the Eskimo encounters in his need for shelter, then it will be false to reality to use only imitative materials. In that case, if it is impossible to use snow and ice to make a house, one could at least make ice cakes of mixed salt and flour, which would be imitative, but more truthful to process at least. Again, in the study of pioneer life the actual making of real candles or a real log cabin is necessary to give appreciation of the problems of the pioneer, whereas the paper log cabin would have place only in a scene to show the nature of the landscape or to show pioneer life in its large general effect or atmosphere.

It is, then, the purpose of the project which determines its form. Both imitative and real activities are legitimate, provided the imitative does not take the place of the real when the latter is perfectly feasible. We have had in the past too much imitative, and too little real, experience for children. When the real experience is impossible, as it often is, then we may substitute the imitative. Often, after the real experience has been had through concrete, organizing scenes or representations, this experience may be followed up and interpreted through imitative materials. For instance, children who had been talking over some ideals of civic pride and coöperation were allowed to make a park in the sand table to express their ideas of how to arrange a park, how to care for it, and how to behave in it. The sand table served as a center of thought for this discussion.

Whether a booklet or a chart, a sand-table scene or a peep-show, is best for any particular situation will depend on the subject matter involved and upon the materials

ACTIVITIES INVOLVING MANY MATERIALS

available. Each of these types of organization will now be discussed from the standpoint of technique. The subject matter to be organized will be taken up in another chapter,¹ as will also the methods of teaching involved.²

THE BOOKLET

Booklets may be made individually or co-operatively. The record of a particular project may often be made into a very attractive book for the school library, or for the library corner of the schoolroom. For example, when the group has made candles, the whole process and the enjoyable experiences involved might be recorded in a booklet giving a complete record of the project in terms of writing, drawing, and cutting. A booklet often emphasizes a piece of habit formation or a desirable point of view. Health records, foods, sleep, and other subjects come to mind in this connection. Again, books are means of enlarging experience. For instance, a group of children who thought dogs were creatures that would bite, and who knew nothing else about dogs, began to find pictures of dogs that showed how they play with, protect, and serve human beings in many ways. Real dogs were observed, and the pictures were organized into a scrapbook to show the real character of dogs. Children who were interested in the idea of how a letter travels found pictures in magazines and recorded their real observation of the travels of a letter by making a book to emphasize and to build out their ideas. Again, a booklet is often an incentive for preserving and recording progress in a subject. Good compositions or spelling papers are used as a nucleus to be enlarged, with the motives of collecting and of rivalry adding their influence.

¹ See page 211.

² See page 283.

EDUCATION THROUGH MANUAL ACTIVITIES

When paper is large enough, the best way to make a booklet is to fold the paper double and lay one sheet inside another. This book may be tied by threading a cord into a needle and taking a big stitch in this crease, tying a loose bow on the outside. If the pages are single, they will have to be sewed together, or holes will have to be punched near the edges of the paper and brass fasteners or cord used to assemble the pages. In any case cloth eyes or reënforcements pasted over the holes will prolong the life of the book. The cover of the book should be appropriate to the contents. The letters may be cut by children if they are able to do it, otherwise the printing-press is a solution. The younger children can help the teacher to stamp the letters even before they can read. Sometimes a strip of paper that either matches the book cover or contrasts with it may be printed with the title and pasted on later. This does away with the danger of spoiling the book if the title does not turn out well.

THE CHART

Charts are much like booklets in type. However, the chart is more like a poster, is visible to all at the same time, and therefore may serve better than the booklet where explanations are to be made from a center. Usually the chart has on it pictures or drawn or cut representations of things, or real articles or samples may be fastened to it. The chart may be made to show groupings of related illustrations, as, for example, a chart to show the uses of cotton. This may have one group of illustrations of cotton for clothing uses, one of cotton for health or medical uses, and so on. A chart may have also a sequential arrangement, as in the case of the growth or cultivation of the cotton plant through its various stages.

ACTIVITIES INVOLVING MANY MATERIALS

Again a chart may be fanciful in character. For example, a chart to encourage interest in good books might be arranged like a map with pictures of strange and interesting places and of the characters from stories. A health chart may be a road map similar to an automobile guide.¹

Large sheets of Manila tag are good for most charts. Large sheets of "oatmeal" wall paper serve some purposes. Sometimes several smaller charts put together like a book are better than one large one. Care must be taken to organize the material to get the best effect without overcrowding. Spaces must be left between the groups to afford relief to the eye. The chart must not be too evenly or monotonously spaced. Each group of material must be as interesting as possible in itself, and there must be space between groups, so that the eye can readily grasp the relationship of ideas. The captions on a chart must be easily seen, and should be neatly done in cut-out letters or printed with rubber type. Pencil should never be used for small captions, but printing in ink may be done by hand with a little practice if typewriting is impossible.

SCENES IN SAND TABLES AND SAND TRAYS

The sand table is an old institution in primary-school life. To work out a scene in miniature is always a delight to children, and with care the activity may be made worth while. The teacher must ask herself the question What are the children going to get out of this piece of work? Too often the teacher decides, on the basis of the children's enjoyment, upon a project to illustrate something too old or obvious to them. Any legitimate educational project has a well-defined aim to justify it.

¹ See page 240.

EDUCATION THROUGH MANUAL ACTIVITIES

A sand table may be constructed by a carpenter, or it may be purchased at greater cost from school-supply houses. It is from three to five inches deep, and lined with zinc or other nonrusting metal. Where a regular sand table is used, a cover is a good thing to keep dust out and to serve as a table top for other work. Instead of a sand table on legs a sand pan is often used. It is merely a metal-lined wooden tray made in any size. The advantage of this sand pan is that it can be emptied of sand and stored away easily. It can be set up on an old table or box at any time. It is much cheaper than the table to buy. White sand can be brought in from the hillsides in many localities, or it can be bought from building contractors. The common gray river sand, when sifted, makes a good substitute for the white sand.

When no sand table or sand pan is at hand, any sand-tight improvised tray will do, such as a carton or box cover or a tray made by turning up the edges of a large sheet of Manila tag. In fact, the tray without the sand, or an old table into which tacks may be driven, is often preferable. Sometimes a sand foundation is desirable, but for many scenes sand is not required. Children often work co-operatively on these scenes, but they may also work scenes out individually in smaller pans or trays. Many schools have a tinsmith make individual sand trays, about fifteen by eighteen inches in size, or somewhat larger, as desired.

Any material that best gives the effect or carries out the process is usable, and innumerable combinations of materials may be used. A few suggestions for imitations are here given.

Grass and ground. In sand, plain green tissue paper may cover portions that are to look like green grass. Sand is very lifeless, and should not be left bare except-

ACTIVITIES INVOLVING MANY MATERIALS

ing to show barren ground or sandy expanse. On a tray without sand a piece of dark-green construction paper imitates grass. Sometimes powdered cork, such as grapes are packed in, or sawdust may be dyed green and strewn over the ground. Sometimes green tissue paper is cut into shreds to be strewn about, or into fringed strips to be laid on the ground. In some scenes, such as a jungle,¹ a piece of real sod is brought in and makes a good foundation for the paper vegetation. Paths on the ground may be made by sprinkling sand or by laying down pieces of brown paper cut into the right shapes. Snow is shown by sheet cotton with Christmas snow sprinkled over it. Real stones and pieces of twigs are better than made ones.

Water. The sand may be scraped back, leaving the metal of the sand pan showing for water. In some scenes, such as an island or a seacoast, real water is put into the pan around the sand and stones, and a bit of bluing added. In some scenes a small dish of water may be concealed for a pond or lagoon. A piece of blue construction paper may be laid down flat on a paper tray to imitate water, or in some scenes silver paper or a mirror is better. Dark-blue tissue paper may be crumpled under glass, or without the glass may be crumpled and shaped into waves to show rough sea. These waves or real water and rocks may be flecked with beaten white of egg to imitate foam.

Trees. The making of various kinds of trees was discussed in the chapter on "Paper-Cutting and Paper Construction."² Real twigs from trees are often suitable for bare trees, but they must be chosen with care so that the proportion will be good. Pine twigs are better for pine woods than are deciduous twigs for hardwood forests. Hedges and shrubbery are imitated by fringing dark-green tissue paper or construction paper and arranging care-

¹ See page 252.

² See page 151.

EDUCATION THROUGH MANUAL ACTIVITIES

fully. Trees should be arranged so that there will be interesting groups of foliage with plain unadorned spaces between for relief. The landscape must not be monotonously dotted with trees, nor should it be crowded. Flower beds are imitated by winding snips of colored tissue paper on pieces of toothpick and then sticking these into a little flat lid filled with sand that has been covered with a piece of dark-green paper. Or a small piece of cardboard may be covered and perforated to hold these flowers.

Scenery for backgrounds. Sometimes a piece of scenery is made with colored chalk or crayon or paint, and set up just behind the sand table or tray, to give greater illusion of distance or space. A Japanese scene showed the sacred mountain of Japan crayoned on a large sheet of chipboard. The things on the table led into this background, which gave the whole scene much better effect. In a lumber scene the depth of the forest was accentuated by a crayon background.

Buildings. In Chapter VI some suggestions for the making of buildings were given.¹ Combinations of cardboard boxes are very usable. Corrugated cardboard is effective for making columns look like fluted marble, or for imitating clapboarding or log cabins or slab constructions. To represent a stockade for pioneer defense, the corrugations are set up and down, and each one is pointed at the top. Cement is used as mortar to fasten twigs together for log houses. Stucco effects or the appearance of an old stone wall may be obtained by painting a cardboard structure with a grayish-brown paint and throwing some coarse sand against the wet paint. Thatched roofs may be made of dry grass, excelsior, or raffia. Clay may be used for caves, and for imitations of cement or stucco in such articles as fence posts or fountains. Blocks made of salt

¹ See page 150.

ACTIVITIES INVOLVING MANY MATERIALS

and flour may be built to form an igloo, or an Eskimo house may be imitated as follows: Cut several slashes into the edge of a sheet of paper, cutting toward the center. Now lap and pin these cut edges over until you have made a crudely rounded, cuplike foundation. Cut off the points of paper that hang down, and cut a door into the structure. Now cover the whole with cotton, the softness of which will smooth and conceal the humps left by the paper. With fine black thread and needle mark off some lines on the cotton to show the blocks of ice. If Indian dwellings are to be imitated, they may be made of foundations of twigs covered with cloth or paper; if they are to be real, the twigs should be covered with skins. Cheap chamois skins may be purchased at the five-and-ten-cent store.

People. Flat paper people may be made and colored, or cut from magazines. Clothespins are useful, dressed in cloth or paper. Head and feet may be built out with plasticine or plasteline. Real dolls of the cheap variety are useful and may be used again and again. Clay or plasticine may be used to model people and animals, especially primitive people. Paper animals, painted or colored, are often used.

Thumb tacks, sticks, plasticine or plasteline for holding up trees, and many other supplementary materials are useful in building up these scenes.

THE PEEP SHOW

The peep show is much like a sand-table scene, excepting that it is viewed through a small window in a box, which adds the charm of mystery. Lighting effects are used, and for some kinds of representations greater illusion is possible because things may be suggested but not

EDUCATION THROUGH MANUAL ACTIVITIES

too plainly seen. Usually a carton is used, and the front or top opened for better freedom during the process of construction. The scene is laid out within the carton like a tableau, using much the same materials and ideas as were described in the discussion of sand tables.¹ When all is ready, the box is closed, excepting for a small window or peephole in the front of the box, which may be

covered with a bit of glass if desired. A small hole may be cut in the top of the carton and an incandescent bulb laid over the hole. The bulb may be wrapped in colored tissue paper to give a particular effect, such as sunset or moonlight, to the show. In a jungle scene yellow paper gives a humid lurid effect, and in an Eskimo scene

PEEP SHOW, SHOWING METHOD OF
LIGHTING AND WINDOW FOR LOOKING

purple paper gives a pretty light on the snow. If the electric bulb cannot be had, a little larger opening is cut in the top of the box, and this is covered with thin tissue paper or wax paper to admit just enough light. The title of the show may be attractively printed on the front of the box, or cut letters may be used, and other decoration added. One such show was a picture of the jungle, which forms a setting for so many children's stories. There were paper vines hanging from the roof of the box, and a piece of real sod held various kinds of typical vegetation in paper. A tiny pool made of a silver mirror was the center of attention, with several tropical animals drinking from it. Plasteline monkeys and snakes were to be seen in the trees.²

¹ See page 191.

² See page 252.

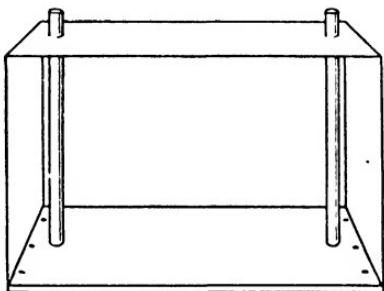
ACTIVITIES INVOLVING MANY MATERIALS

Sometimes a series of peep shows is made, each scene in a separate box. Men's round hatboxes, with a piece of thin paper put over a portion cut out of the top, serve very well. For instance, the history of bookmaking was illustrated by a group in the third grade, who showed in each hatbox some phase of the development of written language.¹ Children of different countries may be shown by costuming dolls and putting each in its characteristic setting.

THE PLAY MOVING PICTURE

An imitation moving-picture show provides a good opportunity to organize illustrations to show a sequence of events or to emphasize some idea. For example, such a moving picture may be made to illustrate the history of lighting; another may be the story of how butter is made; another, a series of pictures to illustrate the need of protection from fire; another, the events in some story such as the "Three Bears." The illustrations may be cut from magazines, drawn with crayon, or cut out. The long roll may be of cloth or of paper that will not be stiff enough, after the pasting has been done, to prevent its being reeled off easily.

Children enjoy experimenting to find a way to mount the reel so that it may be turned to show the pictures. Usually a carton does nicely for the theater. The ends of the roll may be glued to two thick dowels somewhat longer



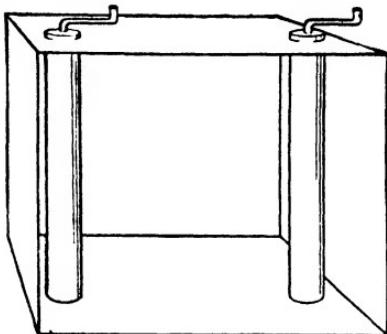
BOX FOR MOVING PICTURE

Dowels are sunk into a wooden base

¹ See page 236.

EDUCATION THROUGH MANUAL ACTIVITIES

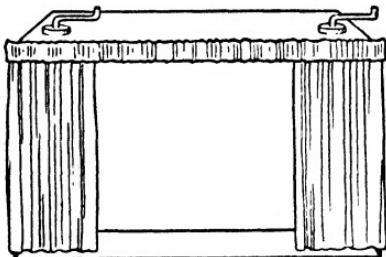
than the height of the carton. The dowels may go around in sockets made by boring holes in two small blocks of



ARRANGEMENT FOR MOVING PICTURE
Cardboard rolls are fitted over spools

wood glued to the floor of the box. The upper ends of the dowels pass through the roof of the carton and serve as keys to turn the film. Small pieces of wood nailed to the tops of these dowels make it easier to turn the film. In placing the film in the box put it as far toward the front as possible, and put the dowels as far apart in the box as possible.

Moving pictures may be made large or small. A large one which requires two children to operate it may be made of a large carton. The film may be attached to two thin but strong mailing tubes which easily move around over two spools glued to the bottom of the box. Some moving pictures are made to reel off from side to side, others from top to bottom, of the carton. Interesting devices may be invented to turn the reel, such as a wheel and crank. Moving pictures may have their titles and explanatory matter carefully printed on the film. The name of the theater may be attractively printed outside. Paper or cloth curtains and valance may make the stage opening more interesting.



FINISHED BOX FOR MOVING PICTURE,
WITH CRANKS FOR TURNING AND
WITH CURTAINS

ACTIVITIES INVOLVING MANY MATERIALS

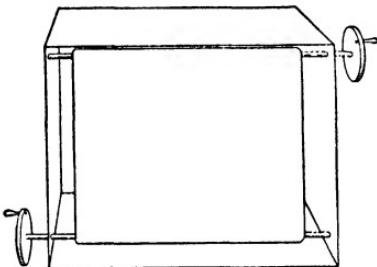
THE EXHIBIT

An exhibit offers much valuable educational experience. Whenever children arrange things for others to see, the opportunity should be used for good training. Once some children were going to explain the weapons and tools of the early cave men to their parents, having made many of these articles themselves out of nature materials as primitive men did. They exhibited their things, neatly labeled and carefully arranged so that their construction and purpose would be clear to the observer. Another group made an exhibit of the materials used in candle-making, taking great care to arrange the things so that the showing would be both attractive and intelligible to all. An exhibit of materials is often the basis for talks and demonstrations by the children, which may make very interesting school programs.

A panorama is a type of exhibit. Some children who had been studying the development of land transportation made some models of the various types of vehicles in this history, and arranged them in order on some long tables. There was a background of scenery, and a road that wound through the landscape. The different vehicles were put far enough apart to make an interesting panorama showing contrast and progress.¹ Water transportation may be shown by setting ships on a table covered with blue paper.

See page 255.

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MOVING PICTURE WITH AN UP-AND-DOWN FILM AND WITH WHEEL CRANKS

EDUCATION THROUGH MANUAL ACTIVITIES

THE PUPPET PLAY¹

Puppet and marionette plays have come down to us from the distant past. In the early history of the church "little Marys" were figures held up while parts were spoken for them, in religious pageants. Thus the term *marionette* originated. The word *puppet* is probably derived from words meaning "child" or "doll," for in several languages there are words of similar structure meaning "doll."

Almost every country in the world has had its puppet plays as a form of adult amusement as well as for the children. Dolls with movable arms and legs were found buried with children in the tombs of Egypt. We are told that many hundreds of years ago an Italian puppet-player went among the vineyards with a puppet show arranged in a box mounted on a leg. Calling the vintagers down to the road, he disappeared behind the box and played his characters, speaking all the parts himself. While puppets are spoken of in connection with all countries, France seems to have made the most perfect and artistic ones.

We have some commercial puppet-players in this country. Among the foremost is Tony Sarg. His puppets are made of wood about three and a half feet high, are delicately and intricately jointed, and beautifully painted and dressed. They are worked by many fine wires held by the operators, who sit up in the beams above the stage.²

The puppet play as a school activity was borrowed from this Old World form of amusement and introduced into both primary and higher grades in a much simpler form than the commercial play. To present the story dramatically, to work out the stage, the scenery, and

¹ See Appendix F, X.

² A little book that is called "The Tony Sarg Marionette Book," published by B. W. Huebsch, gives an interesting account of this work as well as suggestions for children's plays.

ACTIVITIES INVOLVING MANY MATERIALS

the costumes, and to make the whole play effective through the coöperation of the players,— all these are fascinating and educationally valuable problems. Puppet plays offer a very good language motive, for children can throw themselves into their parts without self-consciousness, because they are hidden from view. Many children who do poor work in dramatizations do very well in puppet plays.

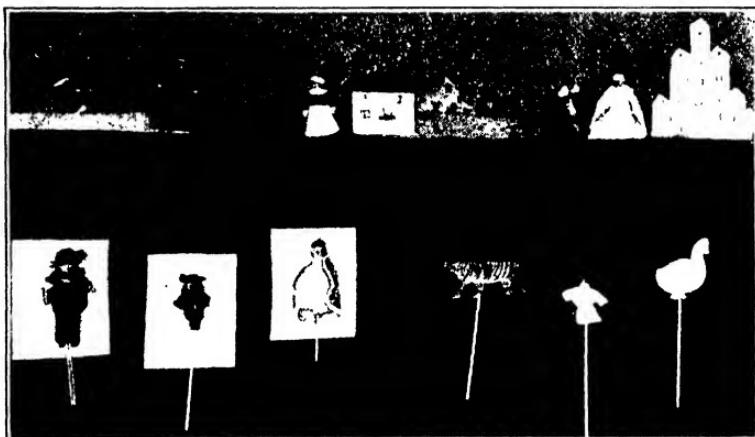
When a tiny child moves his toy animals about and speaks for them, he is really making use of the puppet idea. As usually organized in school, the dolls or puppets are moved about on top of a screen by the children who stand behind the screen, or they are moved in a box stage by strings held above the stage.

Screen puppets. The puppets, or characters, may be flat paper figures cut out of colored paper, or cut from white paper and crayoned, or cut from magazines. It is wise to make the figures double so that they may be turned both ways. A good stick to which to attach the puppet so that it can be held up is the enlarged twelve-inch stick sold by firms that handle kindergarten materials. This is a good stick if only a short one is needed. Dowel sticks are neat in appearance, but it is difficult to fasten other materials to dowels, as they are very hard. Any thin twig or pine stick cut the desired length is usable. The stick may go up between the two parts of the figure. Clothespins make good puppets, when bits of plasticine or plasteline are added for head and feet. They may be dressed in paper or cloth. Dolls made of cloth or stockings, or paper-bag dolls, or small real dolls, are good for puppets. For more grotesque plays even potatoes may be used. Sometimes no stick is needed for the puppet if there are full skirts so that the puppet may be handled by the feet without showing the operator's hands.

EDUCATION THROUGH MANUAL ACTIVITIES

Sticks, when needed, may be inserted between the feet of a celluloid doll by the use of a rubber band.

Another kind of puppet is made with a hollow body; that is, a dress is made without the body. Feet, hands, and head are made of stuffed cloth or of clay, and are attached to the dress. There must be enough hollow space left in the head so that the forefinger of the operating



SCREEN PUPPET SHOW, "THE FISHERMAN AND HIS WIFE,"
MADE BY A THIRD GRADE

Pinned to the screen are also several stick puppets from other puppet shows

hand may be slipped up into it. The thumb goes into one sleeve, the tall finger into the other sleeve. These puppets are used after the manner of Punch-and-Judy shows. The hand is slipped into the empty dress, and much action can be shown by skillful use of the fingers.

Screen stage. Either a screen or a substitute is necessary. If no screen is available, a curtain may be stretched across a corner of the room, and the play may take place on the top of it. A thin strip of wood laid just over the wire on which the curtain is stretched will enable the

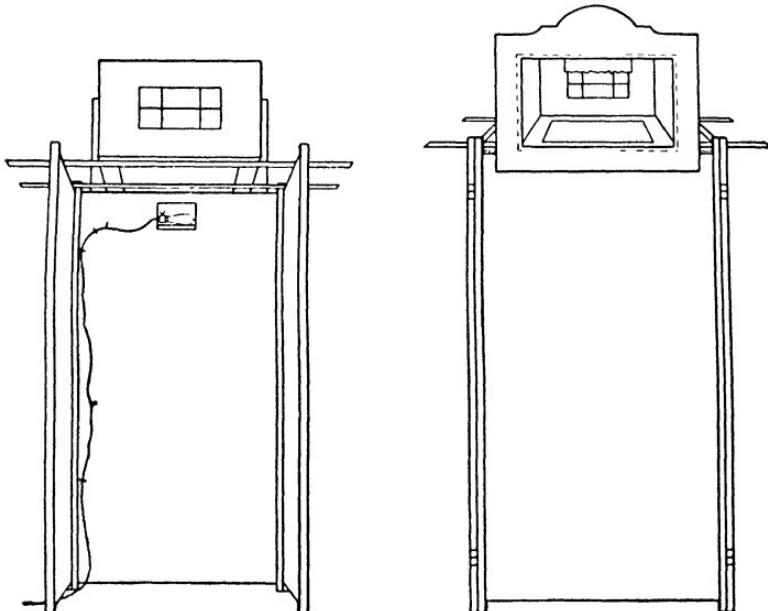
ACTIVITIES INVOLVING MANY MATERIALS

scenery to be tacked to something stable and will still allow the curtain to be pulled easily. However, a screen is more convenient than the curtain arrangement. Suppose that we use a screen, and consider the top of the panels the stage. One, two, or three panels may be used, according to the story. For example, in the story of "The Boy who cried 'Wolf'" the first panel may be the pasture, the second is left free for the action, and the third is the village. Some flat paper trees, some rocks, and some sheep are fastened by thumb tacks to the top of the first panel, the necessary room being allowed for the action to take place. The boy will have the whole center panel across which he may run to get help. The village may be represented by some flat fronts of buildings. The puppets are the boy, the wolf, and the villagers, and the children learn to operate them so that the sticks do not show. The screen stage and scenery must not only include all that is necessary in order that the action may take place, but there must also be enough scenic effect to make the play pleasing to the eye.

Box stage on the screen. Sometimes it is desirable to show some action in the interior of a room or house. This room may be indicated by simply pinning some chairs and tables to the top of the screen, but a more interesting, complete interior is made of a carton. Cut out the floor, excepting a rim around the edge to which furniture or scenery may be attached. The opening of the box may be framed to set it off. To mount this box on the screen is a problem to be solved with the particular box and screen. The front edge of the box may rest on top of the middle panel of the screen and the remainder of the box extend to the rear and be supported by some sticks laid across the other two panels. Or the side fronts of the box may be tacked to two laths or other sticks that

EDUCATION THROUGH MANUAL ACTIVITIES

may extend down close to the screen as the box rests on the top of the screen. If there is need, these sticks may be tied to the screen or sewed to the cloth panels. This arrangement makes the sticks at the rear of the screen unnecessary. Double-acting hinges on screens are much



BACK AND FRONT VIEWS OF BOX THEATER MOUNTED ON A SCREEN

Sticks laid across the screen, the cut-out floor, and the method of lighting are shown

more usable for these purposes than ordinary hinges, because they allow the panels to turn in either direction.

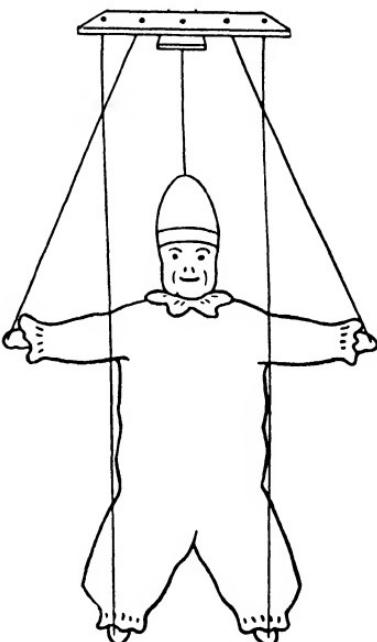
Specially constructed theater. A screen theater may be made for puppet plays and kept for that purpose. Three panels of wood or compo board are put together with hinges to form a three-sided inclosure, the middle panel facing the front. Into this middle panel is cut as large

ACTIVITIES INVOLVING MANY MATERIALS

an opening as the desired theater front. At the rear of this opening any staging may be built that does not interfere with the action of the play. This theater is usable for stick puppet plays, and with some modifications could be used for string puppets. A pretty curtain and scenery may be designed for the theater.

String puppets. Real or homemade dolls make good string puppets. In either case the arms and legs must hang absolutely limp so that movement will be free. Strings are tied to hands and feet, and these four strings are carried up above the doll's head through small holes made in a small thin board and fastened there. This board holding the strings stabilizes the puppet and the strings so that the situation is more easily regulated. The person who is not familiar with the string puppet will derive much satisfaction from experimenting. Try moving the board in different directions and with different tensions of the strings, and observe the effect on the puppet's arms and legs. Practice is necessary, both in making and in operating the string puppet. Probably only the older groups of primary children will make string puppets.

Stage for string puppets. The stage may be simply a table placed in a doorway, so that the children, standing



STRING PUPPET

EDUCATION THROUGH MANUAL ACTIVITIES

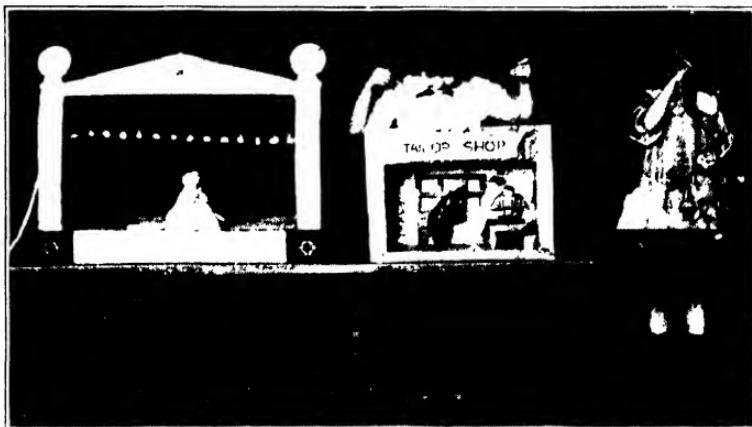
on chairs, may operate the puppets from above. The children may be hidden by a cloth or curtain draped across the doorway above the stage. The scenery for this should be painted or crayoned cardboard scenes set up in folder fashion toward the back of the table.

A stage may also be made from a carton, with the ceiling, or cover, removed, and doors cut in for the entrance of the dolls. A collapsible permanent theater may be made by using for the floor a flat wooden box. The theater front may be cut from a piece of strong compo board, and may be as elaborate in shape and decoration as desired. There may be a curtain that goes up and down by means of strings that pass through many brass rings sewed to the back of the curtain. This is an interesting problem for experimentation. When the front is ready, some side pieces may be cut from the compo board ; and when the theater is to be set up, they and the front are backed against the front and sides of the wood foundation. The side pieces, or wings, must not be more than just wide enough to support the front. Each wing is attached to the front by two small blocks of wood, each of which has a hole bored through it for the nail. One block is glued or tacked to the back of the theater front ; another block is attached to the side front so that it is just under the block on the front when the two pieces are in position ; a nail is then slipped through both blocks to hold the pieces of compo board together. There are many interesting little theaters that may be devised by children.

Stage devices for puppet plays. Many original devices make puppet plays more real and add to the children's enjoyment. For instance, in a play made from the story of "Cinderella" a bugle was sounded behind the scenes whenever the king's messenger arrived. The illusion of a ballroom was created by the guests' passing from the

ACTIVITIES INVOLVING MANY MATERIALS

stage through doors at the rear, where there was presumably a ballroom. A phonograph, secreted in a coat room behind the play stage, played the record of an old-fashioned waltz, the strains of which seemed to be coming from another room. The striking of the clock was indicated by the real chimes that were struck, and the



LITTLE THEATERS AND PUPPETS

First, a little theater; *second*, operating a string puppet in "The Tailor and the Bear"; *third*, operating a string-puppet clown

departure of the coach was suggested by passing a black silhouette of a coach and four behind the open windows at the rear of the stage.

If curtains are drawn close to the sides of the stage in a screen play, the effect is better. This is true only of scenes where boxes are used and the remainder of the screen is not in use. These box interiors may be lighted up with splendid effect by tacking to the screen just under the box a small piece of mailing tube with the top third cut off lengthwise. In this frame an incandescent bulb effectively lights up the box and costumes.

EDUCATION THROUGH MANUAL ACTIVITIES

Choice of stories. Not all stories can be used for puppet plays, because there are stories whose events it is impossible to show mechanically, or whose development depends upon facial expression or upon other factors than action. Action is necessary to most puppet plays. Some things in stories are better left to the imagination than poorly shown. It would be impossible to show the transformation of rats into coachmen, but it would be possible to have it suggested by the conversation or actions of the characters on the stage that this miracle was being performed in the hallway or outside the house. The story must be studied to find ways of preserving illusion. It seems superfluous and tiresome to have children get up before the audience and tell the whole story before the play begins. The play ought to reach the audience on its own merit and by means of dramatic worth. Sometimes posters are held up, or spoken prologues or introductions to scenes give necessary information without destroying illusions ; this may usually be done in an interesting way.

On the whole, puppet plays are of tremendous interest ; they are full of good material for thinking and planning, for research to get true ideas about costumes and speech, and for encouraging a vital use of spoken English.

**PART II. THE RELATION OF HANDWORK
TO SUBJECT MATTER**

INTRODUCTION TO PART II

Part I of this book described the principal hand-work materials and their possible uses in meeting the everyday problems of children in play and work, as needs arise and as the urge for self-expression manifests itself. The values of such handwork are apparent to all, for the attitudes, skills, and knowledge thus fostered are of great moment.

There is another important aspect of handwork, with which Part II will be concerned. Handwork may be a medium, or agency, through which subject matter may be clarified. There is a vast amount of race experience, as well as the understanding of one's own environment, which becomes more real and vital to children through actual, rather than through reported or secondhand, experience; and it is only through the real activity that those appreciations which we so much desire have a chance to arise. For instance, no amount of reading or telling about the struggles of the pioneers to get clothing can take the place of actually experimenting with wool from real sheep. Children may learn to clean, card, spin, and weave in the way the pioneers did these things. To hear about candle-making, or to see pictures of it, is in no sense a substitute for the real activity, which can easily be done anywhere. In this age of ready-made adaptations, when we can scarcely make enough opportunities for first-hand learning, we must depend greatly on the field of manual work to give children the experiences that will make their lives more meaningful. We shall point out some of the fields of subject matter that particularly lend themselves to this clarification through manual activity. Much of the material in Part I will be important as a background for the problems in Part II.

CHAPTER IX

OUR INDUSTRIAL INTERDEPENDENCE

The field of industrial life is very closely allied with manual materials and activities, and an appreciation of our industrial interdependence is fundamental to the welfare of the individual and the group. In order that this kind of adjustment may be made between the child and his environment, every school should include as a vital part of its curriculum those experiences that will interpret to the child the industrial world with which he is so inextricably bound up.

The making over of raw materials into such forms as are demanded by human beings for their welfare and progress takes place in several important fields. Although these fields overlap and interweave, for want of a better classification we shall adhere to the well-known units of food, shelter, clothing, utensils and mechanical agencies, and records. In putting down suggestions under these headings it is not intended to encourage an isolated basis of subject matter. In fact, this arrangement of the material is merely a convenient concentration into these units to show how certain large concepts about human activities may be built up through various emphases, although these concepts should be built gradually and over the whole primary period through recurring problems rather than through one tremendous dose of food or of shelter or of clothing.

In general we shall assume that children will work from the home as a center, through the school and neigh-

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borhood, into the community, and finally become interested in the problems of other times and peoples. The far-away is never to be regarded as more important than the near-at-hand.

FOOD

Values in study of foods. Besides being so very important, foods are of especial interest to little children. However, in training we have made but slight use of this great interest; in fact, many administrators of school funds would be unwilling to think of food as an educational material for little children to use. Yet because of the strong interest in foods in these early years, valuable attitudes and habits could be established during the logical period of habit formation that would materially affect the future health and happiness of children. Foods are discussed as a matter of hygiene in most schools, but there are many concrete activities, distinctly in the manual field, that afford direct contact.

In many homes children are allowed to wash the dishes and to do other menial tasks in connection with food preparation, but are not allowed to help in the more interesting, creative work of planning, combining, and serving food. This fact and the fact that many women openly consider cooking as drudgery serve to rob the whole matter of its rightful dignity and enjoyment. There is great opportunity for creative thought in the planning, serving, and eating of food. Ästhetic appreciation may play a large part if it is encouraged, for color, texture, and form may be noted in food as well as in other things. Children should be allowed to share in creative experiences of cookery as well as in the chores.

Some of the important values that may result from a study of foods in the lower grades, as well as in higher,

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are the following: a general interest in the subject, a feeling that intelligence is necessary in the matter of choosing and preparing foods, and a beginning of an understanding of how people depend on one another for their foods. The children may learn to what extent their own community contributes their food and how it helps to feed others. They may build up a set of habits in regard to foods that may dispose them toward right living for their whole lives.

The study of food may take place in a variety of school exercises and in connection with several other subjects. Discussions, investigations, experimentation, and reading may be done in the language, arithmetic, handwork, and hygiene periods. The actual preparation of food offers difficulties to some teachers, but it is surprising what can be accomplished without special cooking equipment. Moreover, it is encouraging to see that primary rooms in new school buildings are being fitted with kitchen equipment. Often, when there are domestic-science rooms or lunch rooms in the building, they may be used by the primary teacher. Sometimes an electric plate may be borrowed for occasional use. Then there are many foods that may be prepared without the use of heat. Parents are often willing to lend utensils and to coöperate by allowing children to bake in home ovens what they have prepared in school.

The following suggestions for the study of food were made for children of southern Minnesota. They would have to be adapted to the use and special needs of other regions. It is impossible to make suggestions with reference to special grades that will meet the needs of all schools, and those here given merely indicate a progression showing how lines of emphasis may be continued from grade to grade.

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Some suggestions for subjects of food study. The storing and preserving of foods offer interesting topics. In the kindergarten and the first grade the children may take up the canning and drying of foods, the preparation of cellars and pits, and the preserving of eggs for winter. Actual canning and drying may be done in school, and excursions may be taken to see these activities in the community. The first and second grades may find out how food is stored for selling by visiting the grocery stores, the wholesale houses, and the grain elevators. Children in the third grade may study refrigeration by observing the home ice box, its use and care, the large ice boxes in stores, the cold-storage plants, and the refrigerator cars. The values to health of refrigeration may be emphasized and a comparison made of old and new methods,—the cutting of ice and the making of artificial ice. The extended uses of ice today, and the hygienic considerations involved, are also studied. Some of the suggestions made in Chapter VIII¹ will be useful here for the organization of such subjects as these in objective form.

Children of all grades may do something with the classification of foods as to kinds and food values. This study would have to be adapted to the particular group. A play grocery store in the two lower grades would necessitate a classification of foods as to kinds. The grocery store may be set up with boxes and boards in a corner of the room, and the groceries may be made by the children. Clay fruit and vegetables may be made, with paper foliage put in while the clay is soft; clay candies may be wrapped in tissue paper to imitate the various kinds; clay pastry and other imitations of food may be made, and children may buy and sell and carry on the store-

¹ See page 199.

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keeping with considerable educational profit if the desirable attitudes and behavior are stressed.

Food production has a number of phases of interest to children. A study of the dairying industry may be started in the kindergarten by the making of butter and, if possible, by a visit to a creamery and a farm. Sometimes children make churns out of tall glass jars such as paste comes in. The cover may be a wooden wheel. The dasher may be a dowel stick with two small boards crossed and nailed to one end. The other end of the dowel goes up and down through a hole bored in the center of the wooden circle. In the first grade the children may make a study of the care of cows, of the familiar breeds of dairy cows, and of the story of milk production from source to consumer. In the second grade the investigation may take the form of a study of milk products. The making of cheese and of ice cream and the use of milk in the preparation of food may be experimented with. The results of this study may be summarized in the form of play moving pictures, charts, or booklets. In the third grade special attention may be paid to the health aspect, with a survey of the sanitary handling of milk both in the city and on the dairy farm, as well as a discussion of the importance of milk as a food.

Study of the wheat industry may be begun in the kindergarten by making bread for a party and by visiting bakeries. In the kindergarten and the first grade the children may learn the story of bread, from wheat to the loaf, and perhaps they will make a booklet to record the process. Children of the second grade may study and use the Indian method of making bread in connection with their study of Indian life, and in the second or the third grade the children may make a survey of wheat products, arranging a large and comprehensive exhibit.

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Some comparisons of old and new methods of milling may lead to a trip to the flour mill. Children will enjoy experimenting with primitive devices for grinding.

In learning the sources of food the younger children may visit farms to see how the food is raised, and older primary children may inspect a grocery store to discover where the different foods come from, and may make a list of all the foods that are raised in their own community and a list of essentials that it gets from far away.

Whenever foreign life or the life of other times is studied, much enjoyment may be obtained from a study of what those people ate and how they prepared their food. Food problems of primitive life may be demonstrated in actuality. Comparison of those methods with ours may include a survey of the many ways in which we cook food,—with the aid of gas, wood, coal, electricity, and fireless cookers. The travels of oranges, dates, and other foods which come to us from far away may be followed with interest by children.

Foods that children may prepare. Children should have chances to prepare simple foods, as a stimulus to interest in the subject, because there is great educational value in actual participation. Ingredients may be discussed, and their effect upon each other observed. Appreciation of mother and her work may be fostered, and some very definite ways of helping her may be suggested. It also seems worth while for every human being to acquire ordinary facility in the preparation of simple foods. Helplessness along this line is a handicap. Again, some very important hygienic habits and social manners are best taught in this way. The following is a suggestive list of things that may be made by children for school parties and picnics :

1. Jelly.
2. Canned fruit and grape juice.

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3. Gelatin desserts, junkets, cornstarch puddings, custard, and ice cream. Ice cream may be simply made by putting the ingredients into a baking-powder can and covering. Then set this into a pail of cracked ice and salt, and turn the can about in the ice by a twist of the thumb.

4. Butter. Use a homemade churn as described in this chapter,¹ or borrow a hand churn.

5. Bread, drop cookies, or cakes.

6. Nutritious sandwiches. Children may learn how to pack them.

7. Deviled eggs, scrambled or fried eggs for picnics. Children should learn how to test eggs for freshness.

8. Healthful cocoa.

9. Cream sauce.

10. Simple candy, stuffed dates, and popcorn balls.

The school party. A party for the children themselves or for other children or for parents offers worth-while problems. The choice of food, its preparation and serving, the division of labor on the part of the hosts in order to make the guests comfortable, — all these are to be worked out by the children under guidance.

The chapter on "Paper-Cutting and Paper Construction" has many suggestions for party decorations.² Lessons in the simple arrangement of the plants or flowers for the table and in making the room itself cozy and clean are in order. It is very important to teach the eye to demand beauty, not by requiring things more expensive than can be afforded, but by arranging what one has to the best advantage.

Habits and skills to be taught. Children should learn the following habits and skills :

1. To wash hands before touching food and before eating.
2. To wash fruit before eating it.

¹ See page 215.

² See page 160.

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3. To keep hands away from face and hair while cooking.
4. How to set a table, serve food, remove plates, set down plates.
5. How to be a good hostess, how to be a good guest, how to be a good neighbor at the table.
6. How to use the various table utensils.
7. How to eat and drink daintily and silently.
8. To wait until all or several are served before eating.
9. To ask politely to be excused.
10. How to get ready for dish washing.
11. How to wash dishes efficiently.

Food study as the center of a school program. Sometimes children may entertain their parents by giving a series of talks or demonstrations of the things learned about, and by showing the moving pictures, charts, and other exhibits about which the talks may center. The school fair is another way to interest parents in the accomplishments of the children in the way of food study and food preparation.

Connection with gardening and nature study. School and home gardens have an important bearing upon the study of food, and should not be disregarded. To prepare the soil and then to plant and to care for growing things are vital experiences needed by the child, not so much from the economic point of view as for purposes of appreciation.

The child should also be given opportunities to study the foods of birds, to make feeders for birds,¹ to make inquiry into the food and feeding equipment of children's pets, and to know how to feed the occasional outdoor visitor to the school, such as the caterpillar, the hen with chicks, the turtle, or the rabbit. Children are vitally interested in animals, but they need to be encouraged in intelligent and sympathetic care of them.

¹ See page 100.

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SHELTER

A study of the various problems of shelter that have confronted and still do confront the human race will cause children early in life to appreciate the struggle man has made to provide shelter. Children may come to realize the influence of location, climate, and the various desires of people upon the type of home when they study the shelters devised by different peoples, as related in stories of primitive and foreign life and in stories of long ago.

Study of the materials that go into our houses, of where these materials are obtained, of how they are used, and of the trades and professions represented in dealing with shelter problems are all important. A study of our own homes in regard to sanitation, comfort, and beauty and a discussion of how we may all contribute to these factors will help a child, whether he is four or eight years old, to assume whatever responsibility in these matters he is able to handle. It is not urged that these studies be detailed or technical, nor should they be merely factual, but it is important that the emphasis be placed upon appreciation.

Playhouses and doll houses. Children arrange playhouses and doll houses in order to carry on their play of dramatizing home life. Playing house is one of the fundamental plays of childhood, and is vastly worth while for its own sake. The teacher may attach to these activities additional values, such as an increased interest in the problems of homemaking. In planning a room in a house the intended use of that room should influence the choice of furnishings. Convenience, comfort, sanitation, and beauty are related everywhere to purpose, whether in real life or play. Attitudes and ideas awakened in connection with a playhouse do influence real life, as has been demonstrated over and

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over again; therefore it is wrong to suppose that almost any color combination or careless arrangement will do for a playhouse since it is "only play."

House-furnishing may be an individual project or a group enterprise. By playhouses we mean those structures which children themselves may enter. Doll houses are miniature structures for play with dolls.

One way to arrange a playhouse is to shut off a corner of the room by means of a screen or screens, preferably with double-acting hinges. For a permanent house, partitions may be set up by a carpenter. One schoolroom has a four-room apartment set off by partitions of compo board, framed in two-by-two strips of wood which were grooved to admit the boards. The partitions are four feet high, and are held upright by angle irons screwed into the floor. Windows are cut out, and doors are simply openings left by moving the partitions to allow for them. Another way to make a house is simply to nail the compo board used for walls and partitions to strips of wood, and then to nail these strips to the walls or floor. Sometimes a large packing box is brought in and furnished. Often regular houses are built in a highly finished way with clapboards, roof, and all the other features of real houses. These cost a great deal, and take up much room. In ordinary situations some of the simpler arrangements mentioned seem better.

Doll houses are sometimes constructed of wood by carpenters or by teachers and children. Unfortunately, the house built for a primary room is often of such poor proportions and arrangement that the teacher has difficulty in furnishing it satisfactorily. If there are two rooms above and two below, one of the downstairs rooms should be partitioned off to give place for a dining nook or a kitchenette. Better than the four-room house is the bungalow with a

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more convenient arrangement of rooms. Boxes may be combined, or a large box may be partitioned off. Cardboard houses are easily made from cartons. Now and then children play with collapsible houses, which are nothing more than three-sided folders of cardboard. The child sets up such a house, and puts into the inclosure the furnishings, which, when not in use, he keeps in a box.



TWO ROOMS OF FOUR-ROOM APARTMENT WITH PARTITIONS
OF COMPO BOARD

Furniture made of old boxes by six-year-old children

Windows and doors must be carefully measured. They may be planned on the inside of the room, but the drawing and cutting are much more easily done on the outside. A child too young to use rulers may draw around true building blocks. A good way to judge of the position of windows while experimenting is to fasten pieces of colored paper with thumb tacks to the inside walls. In a wooden wall the windows may be cut by first boring a hole in the corner of the drawn space, and then inserting

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the keyhole saw. Windows in cardboard houses are cut with a sharp knife. Cut two opposite edges of a window first, then the other two. Doors in cardboard houses may be hinged with adhesive tape, or may merely swing back on a crease of the cardboard. Wooden doors may be hinged with small metal hinges.

Walls should be covered with paper that does not have too large a pattern. Real wall paper of suitable design may often be found, or thin construction paper may be used with stick-printed or paneled decoration. Windows and doors should be framed, and there should be baseboards. In large houses these may be made of strips of wood; in small or cardboard houses they may be of paper. Paste for hanging wall paper may be made in several ways. A prepared powder may be purchased to mix with water, or starch paste may be made by soaking laundry starch in cold water and cooking until clear. Paste may be applied to the paper with a clean bristle brush of large size or with a swab made of a piece of soft cloth. It is easier to cover a wall, windows and all, with paper, and then later to cut out the windows from the outside. Pat the paper smoothly down with a dry cloth or a dry, clean brush. In some cases walls are tinted or painted with flat color instead of being papered. When pictures are hung in miniature houses, the scale must be considered.

Floors in wooden houses may be stained if they are perfect enough; otherwise they may be painted. There are also several good covering materials. Oilcloth of small design looks like linoleum in the kitchen or bathroom of a doll house; or a remnant of heavy material which is an imitation of polished wood may be bought from the furniture dealer.

Furniture and furnishings have been described in several other chapters.¹ When many materials are exper-

¹ See pages 39, 113, 175.

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mented with, it is surprising what pleasing effects result, and this use of varied material will eliminate too artificial modes of construction. On the whole, the larger the scale the easier it will be for children to work. Many a house has been so small that it was a genuine hardship to children to make furniture in proportion. It seems unwise to ask kindergarten children to make furniture of paper, and even in the other grades furniture should be made of true materials excepting in cases where a paper room is used merely to illustrate a principle or scheme of decoration.

The exterior of doll houses may be made attractive with chimneys, window boxes, blinds, and porches. This is, of course, a matter of choice and taste.

Some factors in home-building. In the kindergarten the children may discuss what homes are for and make simple comparisons between our homes and those of animals and birds. Very simple observations may be made of building materials and the processes in house-building. Building houses with blocks offers opportunity for stressing the essential features of houses.

In the first grade the children may make a more detailed study of house-building, centering the study around the actual building of a playhouse or a doll house. Plans may be drawn, and an architect's office may be visited. Going to a lumber yard to buy the materials, understanding where those materials come from, and furnishing the house according to modern standards of living involve problems that are well worth while.

In the second grade the problem of shelter may include the relationship between homes. Such problems as these may be discussed: how to choose a good location for a house; how to arrange the houses in a block; how to secure building permits and building regulations. The whole study may center around a village laid out on the

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floor or on the table, resulting in a practical demonstration of what has been learned. Each child could incorporate into his own store or house his ideas of convenience and beauty, and coöperatively the children could work out the appearance of the town as a whole. The village would probably be constructed of cardboard boxes. Sometimes this idea of a village may be worked out with wooden boxes big enough to get into; these houses are built out of doors so that the community idea may be expressed quite fully.

In the third grade the children may study modern tendencies in housing and the advantages and disadvantages of apartment life. An appreciation of the comforts and conveniences of the modern home may be centered around a review of the shelters of primitive man, as studied in the first and second grades, and around the homes of early times. After children have had some acquaintance with primitive life, they will enjoy tracing the development of homes. Stories of tree dwellers, of cliff dwellers, of Indian life, and of foreign lands all offer opportunities to stress both the likenesses and the differences in shelter problems throughout the world. Children may show these homes and characteristic surroundings in the sand table, the peep show, or the puppet show. A very interesting panorama may be made by making a series of models of the various stages in the evolution of the home, showing the changes that have come about from the tree dweller's house to the apartment house.¹

Another interesting study is the development of the lighting of homes, beginning with the torch, taking up the grease lamp, candle-making, and the more modern changes. Children of any age may make candles by dipping or molding (see the project on candle-making in the last chapter in this book). The history of heating houses

¹ See page 255.

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is another development worth studying, beginning with the camp fire and ending with the modern furnace.

Suggestions to aid children in sharing home care. It seems reasonable to expect that changing children's attitudes toward the problems of home-making should lead to the development of a large number of helpful habits. How to care for the home may be a part of the work in each year of school life. How to clean windows, how to sweep and dust properly, how to preserve furnishings from needless injury, how to clean or launder house-furnishings, are some of the subjects that can be taught by actual demonstration. Children may share in the various duties of caring for the schoolroom. If guided intelligently and with interest, children usually enjoy doing these tasks.

CLOTHING

In presenting material on the subject of clothing, the aim is to influence children in their general attitude toward clothing, as well as to teach them facts and skills that will make them more coöperative in the use and care of clothing. Articles of clothing are of great moment to children, and one may easily attach educational value to this interest.

There is perhaps little of insight into the clothing industries that kindergarten children can appreciate, beyond general discussion in connection with dolls. Some comparison of the coverings of animals with the clothing of human beings, a discussion of where we go to buy materials, of how mother makes our clothing or buys it ready-made, and a trip to the dry-goods store are some of the possibilities for that grade. The children may arrange a play store¹ in the kindergarten. Remnants of cloth may be brought from home, wrapped on little boards, and sold

¹ See page 163.

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for dolls' dresses. Paper hats and other wearing apparel may be made also. Kindergarten children may learn something of the different kinds of fabric in their own clothing.

In the first grade there may be more differentiation of the main materials of which our clothing is made. The children may examine their own clothing and make a chart or a list to show that cotton, wool, linen, silk, rubber, leather, fur, and bone all combine to form our clothing.



A THIRD GRADE TELLING ABOUT THEIR PROJECT, "PIONEER CLOTHING"

Directed by Miss Amanda Johnson, State Teachers College,
Mankato, Minnesota

In the second grade some of the sources of our clothing may be studied. What does our own community furnish? What plants and animals are most useful to us in our clothing?

In the third grade the children may discuss the comparative values of the different materials in their relation to bodily comfort, considering materials suitable for special purposes and for different seasons or climates, and also the cost of clothing and the problem of cleanliness.

In all three grades certain materials may be studied

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more intensively. Wool may be studied from the raw to the finished product. Children may see real sheep sheared and may take the raw wool and cleanse it; then they may card and spin it (or see someone spin it), and may wind, dye, and weave their finished yarn. A study of fur and leather is interesting, beginning with

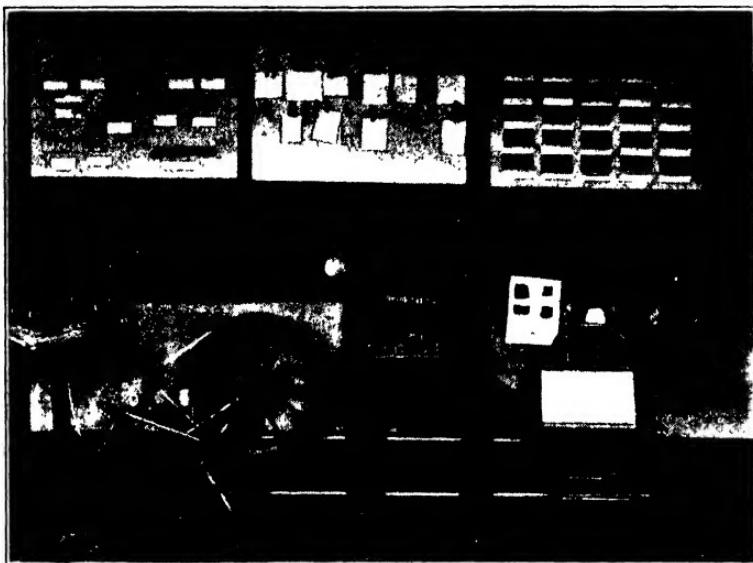


EXHIBIT OF THIRD-GRADE PROJECT, "PIONEER CLOTHING"

the kinds of fur-bearing animals, then taking up the trapping and skinning, the preparation of skins, and the uses to man of fur and leather. Children will enjoy preparing the skin of a rabbit to see how it is done. A simple study of cotton and silk may be begun in the first grade, and more thoroughly carried on in the second and third grades. Materials such as cotton bolls and silk cocoons may be purchased.¹ A cotton project is described in the

¹ Industrial Arts Coöperative Service, Columbia University.

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last chapter.¹ Rubber — its gathering, its manufacture, and its varied usefulness to man — may be studied with profit. A study of rubber is included in the last chapter.²

The historical development of clothing is another good line of investigation. When any form of primitive life is studied, it is interesting to note especially the clothing, and to compare it with that of the present day. By the time children have studied Indian problems of dress, the dress of the tree dwellers and cave dwellers, and the dress of Eskimos and other foreign people met in their reading, they have a rich background that will enable them to make some conclusions regarding the influence of location and climate upon dress. In the third grade a study may be made of the changes in clothing due to changes in the art of weaving. Some insight into the knitting industry is interesting, and children themselves may knit enough to understand the process. A style show or a series of peep shows may be arranged to show dolls of different nations or periods of history in characteristic settings. This may form the basis of a school program in which the children may relate interesting things learned about these people.

Skills and habits to be stressed. All children may learn to sew on buttons, to shine shoes, to put on wraps, and to hang them up. A coat-room demonstration is good for this. Some insight into laundry methods may be taught, even to four-year-olds, in connection with dolls' clothing that is washed and ironed in school. Simple darning, removing spots, and other skills and habits may be taught.

The making of garments begins with the dressing of dolls. This activity, together with costuming and other clothing

¹ See pages 332-338; also Appendix F, I.

² See pages 319-324; also Appendix F, I.

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projects, was discussed in the chapters on "Weaving" and "Sewing."¹ It may be a part of every child's experience.

In any grade good habits must be stressed, such as the protection of his clothing by an apron when a child is painting, and by a napkin when he is eating; care to prevent needless injury to clothing in play; and the specific help any child may give to his mother in the care of clothing. All these are habits to be taught by actual doing,—not as hated chores but as activities which are satisfying because of intelligent participation. The hygiene and suitability of clothing may be stressed to influence children to have a more reasoned attitude toward their clothing.

UTENSILS AND MECHANICAL AGENCIES

Under this heading come tools, machines, instruments and appliances for various purposes, and containers; in short, all those devices by means of which man is aided in work and in play. All these contrivances are best studied in relation to the needs they serve in helping to provide people with food, shelter, and other necessities of life. However, it is well for children to get an appreciation of the fundamental principles of service which this field represents. The ingenuity of man is nowhere better shown than in the vast number of wonderful tools and machines which have been invented to meet the needs of daily life. The increasing control of man over his environment is due in great measure to these inventions.

Little children are intensely interested in mechanisms that "do things," although their interest is not for technical detail. They should be allowed, however, to see and discuss what is within their mental reach. Children

¹ See pages 19-24, 38, 50.

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of any age should be taught intelligent use and care of the tools and machines they use or have contact with in school, thus establishing an attitude that will follow them into the home. Excursions may be made to see the many interesting machines that are used in the principal industries represented in the community.

Tools and machines. In the first grade the children may make a survey of the tools and machines that help mother in her cleaning, cooking, and sewing, and of those that help father about the house. In this grade the children may make a chart with pictures of these many articles. These children may also make a tour of the school to see what tools and machines the janitors use. In the second grade the children may survey the tools and machines used by the farmer, noting especially the saving of time and labor by means of machinery. In the third grade the children often make studies of the tools and weapons of primitive life, comparing them with the tools of today. Greater appreciation of the increased resources of today should result.

The tools of special trades and occupations are best studied in connection with real activities, especially when excursions are made to see these. Incidental emphasis all along the line would do much to awaken in children a profound respect for the inventive mind of man. Stories of inventions and inventors are many, and afford the historical background and the human interest which are needed to color the whole study vividly. Children may be urged to bring to school their own inventions in the field of toys or tools.

Transportation. There are many special fields that offer rich material for study of the general subject of mechanical inventions. Transportation is one of these. Five-year-olds may survey the kinds of vehicles they ride in,

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from toy scooter to airplane. They may cut out pictures and organize them into a booklet that shows this study. Older children may make a more detailed study of how we travel by land, by sea, or by air. The world flight of United States army officers was talked of by the youngest children. Children may also find out how certain articles of food are brought to us, and they may be taken to see trains of cars being loaded with the products of their own community. The history or development of transportation since primitive days, or even since our grandfathers' days, is interesting. A series of models of the various types of vehicles¹ may be made and set up as a panorama to show this development. A comparison may be made of modes of travel used in this country with those used in other countries known to children through their literature, and the results of the study may be shown in a play moving picture.

Musical instruments. The instruments of music are of great interest to children, and this field of study has broadened more than ever now that little children play simple instruments in the lower grades and modern methods of teaching music to little children emphasize creative listening and creative effort in making music. Again, the radio and the phonograph are doing much to give opportunities for musical experience. Some suggestions for the making of simple instruments were given in Chapter VII.² Even kindergarten children may make a study of how music is made, finding that percussion, wind, and strings are important factors. Older children may cover the field more thoroughly, learning about more instruments, how they sound, and how they should be handled. A study of the musical instruments of the Indians and of other primitive peoples is interesting (see Chapter XV³ for suggestions for this). Catalogues with

¹ See page 255.

² See page 170; also Appendix F, V.

³ See page 330.

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pictures of musical instruments may be obtained from music stores, and it is possible to purchase sets of large colored plates illustrating musical instruments. Actual experience with instruments may be obtained by inviting older children to come in to play for the younger groups, by taking children to music stores to see instruments, and by listening to phonograph records. Charts or other concrete records of the study may be made by the children to show what has been learned.

Telling time.¹ The different methods of telling time used by man in the various stages of his development make a good study for the third grade. Actual experimentation with the problem of how to tell time without clocks will suggest many of the devices which primitive man used. The children may then read of the various devices for telling time used through the ages, and they may try out many of them, such as the notched candle, the knotted grass, the sundial, and the hourglass. Modern methods may be discussed, but not from the technical point of view. A visit to a clock store will show many varieties of timepieces, and a study of novelty clocks, such as the cuckoo and the chime clock, will be very interesting indeed. The neighborhood of the school may yield some old-fashioned or foreign timepieces. The children will enjoy knowing about some of the tower clocks and carillons of the Old World.²

Communication. The devices by means of which people communicate with one another are at least worth surveying in primary grades. A general appreciation of the value to human life of the telephone, telegraph, mail service, cable, and radio may be touched upon. If possible,

¹ See Appendix F, XI.

² Some were discussed in "The Singing Towers of Belgium and Holland," in the *National Geographic Magazine* (March, 1925), Vol. XLVII, p. 357.

OUR INDUSTRIAL INTERDEPENDENCE

excursions should be made to see these instruments and their operation. The travels of the various types of messages may be followed from starting-point to destination, partly by actual observation and partly by reading or imagination. Children may learn the value of obeying mail-service rules, and may learn to write addresses carefully to help the post office. Some of the problems of public-service employees may be told the children. Demonstrations may be given of the proper way to use a telephone. Children in the third grade may make a study of the relative ease of communication today as compared with that in the day of our grandmothers or great-grandmothers. The problems of communication in primitive life, pioneer days, or in foreign countries will be of interest to children when there is some connection with stories of those peoples.

Recreation. There are numerous devices that aid us in our recreation. The modern equipment for sports, for travel, for enjoyment, and for games and amusements may be contrasted with that of other times or of other peoples as they are met with in reading. Toys and plays of primitive and of foreign life may be investigated, and the toys of other lands may be made. Some of the countries famous for toy-making afford interesting stories of ingenuity and skill.

Containers. There is a considerable amount of industry that has to do with providing the various kinds of utensils and containers for many different purposes. Many of these are closely related to the problems of food, shelter, and other topics already discussed. It seems wise, however, to take up the special values of particular kinds of material for containers, and to make comparisons of these devices, in order to discover how ingenious man has become in the matter of keeping pace with these demands.

EDUCATION THROUGH MANUAL ACTIVITIES

One material used to make many of our containers is clay. Children may learn what clay is, where it comes from, how it is prepared, and how it is useful to man.¹ A chart may be made to show the uses of clay. Clay may be dug from a bank and refined and used by the children in making dishes. The making of many articles of pottery has been discussed fully in a previous chapter.² Allied forms of clay, such as cement, may be studied. A simple study may be made of the pottery industry, beginning with primitive pottery and concluding with the manufacture of modern pottery and china dishes. Collections may be made of many types of pottery and china to show the interesting variety in design.

Paper is another important material from which containers are made. Children may collect pictures and samples of boxes, cartons, cases, and such articles as drinking-cups, paper plates, oyster cartons, and a great variety of other containers that meet the needs of modern life.

Baskets form another type of container. Some interesting ones may be borrowed and examined by the children, and a study of Indian basketry is decidedly worth while. The modern materials for baskets may be examined, and it may be discovered where and by whom they are made. Children may experiment with such very simple baskets as were described in the chapter on "Weaving."³

Wood is used for making many containers, such as tubs, boxes, barrels, chests, crates, and trunks. What kinds of trees are useful in these industries, and where do they grow? A visit could be made to local factories that make such articles.

Glass, metal, and leather may also be studied in relation to their use in containers, thus adding emphasis to the great scope of this industry which provides containers.

¹ See Appendix F, VIII.

² See pages 76-81.

³ See pages 24, 25.

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An interesting study could be made of some of the more rare and beautiful containers, such as old chests and boxes, that show the great skill and artistic ability of the makers. For this purpose children who live in a city where there is a museum are fortunate indeed, but in almost any small town there are some such objects that may be borrowed if care is taken.

Another study may be the investigation of special kinds of containers, such as those for keeping foods hot or cold, those for keeping foods moist or dry, and those for keeping insects out of clothing.

RECORDS

How the race puts itself on record is one of the most interesting of subjects. Kindergarten children may connect their stick printing with printing as a whole. They often dictate stories of their experiences to their teachers, who write them down to be sent home to mother. They may have a library of picture books, both commercial and homemade. In one kindergarten¹ the children have library tables and chairs made of boxes and orange crates. The librarian has a desk made of a box, with appointments such as a stamp, some cards in a clay tray, and a pot of paper flowers. The walls have pictures. The behavior necessary in a library is discussed in connection with trips made to real libraries. Children may go to the improvised library corner if they know how to conduct themselves and how to use the books. Children are taught right habits in picking up books, in holding them, in turning over the leaves, and in putting them carefully away.

Children in other grades continue to use the library corner and learn to use real libraries as well. Since they read, their much greater interest in books can be used to

¹ See pages 114-115.

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interest them in the history of record. They also use rubber type, and write, and are familiar with typewriters, so that they are able to grasp more fully the meaning of the whole institution of record. The bookmaking process may be touched upon by making simple books and binding them. Where possible, children should be taken to



KINDERGARTEN LIBRARY

see bookbinding or other parts of the printing or book-making processes. The printing of a school newspaper and an excursion to the local printing office will be worth while.

As primitive life is studied, it will be found out how the earlier crude records were made. The history of human records through the main steps of progress may be taken up very simply in the third grade.¹ This study may culminate in a series of peep shows, a scene in each of several

¹ A series of post cards, reproductions of John Alexander's murals called "The Evolution of the Book," on the walls of the Library of Congress in Washington, is very helpful in this study. They are procurable by sending to the Library of Congress.

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men's hat boxes showing one stage in the development of records and record-making.¹

Children will enjoy experimenting with the writing materials of primitive life. They will enjoy sending messages in the crude fashion of the Indian or other primitive peoples. They will experiment with pens and ink made of materials found in the woods. They may be led to make a collection of the writing of foreign peoples, especially the types very different from ours, such as the Chinese. The records of primitive peoples and pioneers as shown in their handicraft are most interesting, such as the sampler, the Oriental rug, or the bead belt of the Indian.

A survey of modern records will show children in how many ways modern man may record his ideas. Besides modern bookmaking, moving pictures and musical records are examples of how sights and sounds may be preserved for the future.

Some discussion of paper — its uses and how it is made — may be encouraged, if the technical parts are not too detailed. The purpose of these studies is for appreciation rather than for exact knowledge.

There are many things that children may make to encourage them to own books. Bookracks, bookmarks, and book-ends were described in the chapters on "Woodworking"² and "Clay-Modeling."³ Simple bookshelves or cupboards for books may be made of soap boxes. Decorated curtains may be added to keep out the dust, or wooden doors may be made and decorated with cut-out or painted pictures. Children may make simple book-plates to mark their own books, by first cutting a design in a piece of linoleum glued to a block of wood.⁴ A large ink pad may be used for the stamping if a pattern in black and white is desired.

¹ See page 195. ² See page 125. ³ See page 80. ⁴ See page 31.

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Some other forms of handwork that will encourage children to read are the following: By using drawings or cut-out pictures children may make booklets to record the books they have read. Sometimes a book chart¹ or map is made by one group of children with the idea of interesting another group in the books they have enjoyed. Or the teacher may make an attractive guide map to good books; one such is made like a fanciful map of adventure, — there is a road or river to indicate the path to choose, and along it are pictures or illustrations of the various places and characters described in books, with interesting captions.

Another device for calling attention to favorite characters is the making of character dolls to keep as a part of the decoration of the room. Children who have enjoyed "Little Black Sambo" like a Sambo, made of old stockings, to play with. Children who have enjoyed "Pinocchio" will enjoy having a wooden puppet in the room. Costuming children for characters emphasizes characters in books, and favorite books may be shown by different children, who dramatize some favorite bit of the story of their choice.

Chapter XI² has some further suggestions for relating handwork and literature. Chapter VIII³ discussed the puppet play, which is valuable in this connection.

¹ See page 190.

² See pages 249-251.

³ See pages 200-208; also Appendix F, X.

CHAPTER X

OUR INTERDEPENDENCE FOR HEALTH, PROTECTION, AND SOCIAL LIFE

Our ideas of how we may best live together as members of a community are being formed every minute of the day, from infancy through the whole of life. Hence we must think of the attitudes that are being built up through the everyday experiences of children as most important, and we must regard as materials for any vital teaching of citizenship and morals the specific habits, the knowledge, and the feelings that grow out of innumerable situations in home, school, and the larger community. In the following pages an effort is made to point out the place of handwork in developing social relationships.

HEALTH AND SAFETY

Protection from disease is a prominent thought in most communities through the efforts of all public-health movements. From the preschool years onward, children are being taught to protect themselves and others from disease germs. Some manual activities may emphasize some of the health habits. One group of children made a model sleeping-room out of a carton. They considered the position of doors and windows, the decoration of the room, and the choice and arrangement of the furnishings in their relation to healthful sleep.

One group of children made a model rural school and yard in order to illustrate modern ideas of school health.

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They worked out this project in two parts: First they made the schoolhouse itself of cardboard, on a large enough scale to show the interior equipment. Then they reproduced the school exterior on a small scale and set it on a table, adding grounds, garden, and equipment for play. The children talked about their school at home until the parents came to see it. When a new school was built, the children's model played an important part in the discussions of plans.

Another group decided to have a parade with slogans that emphasized ways of preventing the spread of disease. Each child made a slogan, such as "Catch the Sneeze," and printed it on a sign or banner on a stick. The children marched through the whole school with their slogans.

"How our City helps to keep us Well" was the name of a series of dramatizations that showed the activities sponsored by the community to keep disease from spreading. The children first made a survey of these agencies and then worked them out for other children. The procedure of quarantining a home, of examining the milk supply, of cleaning up the streets and yards, of freeing the city of rats, and other typical civic health activities were dramatized by the children, who played they were city officials at work. The children then made a chart to show how children may help to keep the city healthful.

Another way to emphasize health habits is by means of a health map. It may be a group or an individual enterprise and may be drawn on a large sheet of Manila tag or on a piece of "oatmeal" wall paper. The idea may be worked out as a route or guide to good health, with detours to avoid dangerous places and with interesting illustrations and captions. One such map, about twenty-four by thirty-six inches in size, showed a path

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threading here and there. Cut-out pictures from magazines, crayon drawings, and free-hand cuttings in color were used, and such places as Hot Soup Springs, Spinach Greens, Oatmeal Mills, Milky Way, Book Islands, and Play Meadows were made attractive both in picture and in caption. This idea leads to much invention by the children.

How to protect others from injury is another thought of importance in primary grades, when children are forming habits. The subject of safety on the street brings up traffic regulations, methods of crossing the street safely, and discussions of how children can avoid injury to themselves and to others. A street intersection may be worked out on the floor, or on a table or a shelf, with strips of paper for walks and streets, and cardboard boxes or blocks for buildings. The people are made of clothespins or may be real dolls. Street cars and automobiles are also made of cardboard boxes. When the setting is complete, the children may work out a series of demonstrations, using the dolls and vehicles as puppets and moving them to show the complexities of street traffic. Whatever is necessary to teach children how to keep safe while crossing the street should be emphasized in these demonstrations.

Injury is often caused by the carelessness of pedestrians in failing to pick up fruit skins or other obstacles to safe walking, and children cause many accidents by rudely jostling people in passing, or by riding into people with scooters, wagons, or sleds, and by leaving these things on the walk for people to fall over in the dark. An original playlet may be worked out in an English class, making use of these incidents in a suggestive and meaningful way. The working out of the play as a dramatization or puppet play would be interesting, from the point of view of character training, English, and manual activity.

EDUCATION THROUGH MANUAL ACTIVITIES

HOW PROPERTY MAY BE PROTECTED

Children may enumerate the ways in which property is lost by carelessness in handling things, by failure to have things labeled, and by picking up the possessions of others. Children may discuss carelessness in the misuse of lawns, shrubbery, and other property, and may themselves make signs to put up on lawns near the school. Making a park in the sand table may serve as a center around which to discuss civic pride and coöperation. To urge children to be the initiators of protection rather than of destruction should be the idea. Sometimes children may make a tool for picking up papers by driving a long thin nail through the end of a stick and then turning the nail over so that a long prong is formed. These pickers enable children to go out on the playground and pick up paper without handling it. In the spring children may make Manila-tag baskets in which to put dandelion plants which they take from the school lawn.

Protection from loss or injury by fire is another topic that may be used to influence children in the matter of fire prevention. A chart may be made of newspaper clippings telling of ways in which fires start, and children may add up the cost of fires, and make posters for fire-prevention week. How to prevent fires may be shown in many ways, such as practical demonstrations showing inflammable materials and the way to keep them safely contained. Actual demonstrations of how to make and put out camp fires safely will help children to eliminate that kind of carelessness. A study of the fire department may lead to a demonstration of fire fighting in general. One group of children made a play moving picture to show the various causes of fires. Another made up a play with "Fire" as the chief character. "Match," "Gasoline,"

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"Rubbish," and other characters were symbolic, and were dressed in imaginative costumes.

A better understanding of the true function of policemen may be gained from a study of the defense of property and life by the police. Making a stop-and-go sign to be used in dramatic play, playing traffic officer, taking turns in superintending group activities and so assuming responsibility, all aid a child to see what is involved in trying to protect others. Stories of the Indians and other primitive peoples, of the Pilgrims and other historic groups, may be told with special reference to problems of defense and protection. Weapons as made by the primitive tribes may be made by the children, and the stockade as an early means of defense may be illustrated in the sand table. Corrugated paper placed vertically, with the corrugations on end, makes a good stockade. Our modern freedom from invasion, and our changing ideas regarding war and the brotherhood of nations should certainly be strongly emphasized.

INTERDEPENDENCE FOR SOCIAL LIFE

More and more those situations which stimulate social behavior in children are being valued, for we now realize that it is only in such situations that children learn the proper social responses. Instead of relegating school parties and festivals to the last day of school or to a time squeezed in with difficulty so as not to infringe upon the full time allotted to the three R's, we are now attaching so much educational significance to these occasions as to put them at least on a par with other school activities.

The school party is an excellent opportunity to stress coöperation, good manners, and social give and take. There have been several portions of this book devoted to

EDUCATION THROUGH MANUAL ACTIVITIES

the handwork side of this activity, such as the discussion of foods¹ and the work in paper on table decorations.² Original playlets and puppet shows, demonstrations of courteous behavior in pantomime or by means of shadow pictures, posters and booklets with original rimes or slogans, are some of the concrete means of emphasizing courtesy.

A puppet show was used in one school as a demonstration of courteous behavior. The scene, arranged along the top of a screen, represented a school playground. The puppets were pictures of children, cut from magazines. These figures moved about in typical playground situations and demonstrated courteous behavior in sharing apparatus, in the use of the drinking-fountain, and in the kindly give and take of play. In such a project as this the children have an opportunity to reproduce situations from actual life and are encouraged to use their imaginations about courtesy. Another puppet show represented the activities at the front door of the school.

The true meaning of our holidays and community festivals may be made clear to children partly by the type of souvenir or remembrance that is made for the occasion. Choosing and making decorations for Halloween, and making the harmless yet grotesque masks, caps, and other favors for the occasion, will help children to get the right interpretation of the day rather than an extreme or inappropriate significance. Knowing the real spirit of Saint Valentine's Day will help the teacher to encourage sincere, simple expressions of love on that day rather than the highly ornate, expensive, or comic kind of valentine.³ Making attractive gifts for others at Christmas time will somewhat temper the great desire to get things at that time. Conducting a sale of toys

¹ See pages 214-217.

² See pages 160-162.

³ See page 142.

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will bring in money for sick or poor children. At Easter time children may make something really beautiful to carry home; on May Day they may be urged to make pretty and tasteful creations to hang at the front doors of the houses of their friends instead of florid, insincere things. We can in a measure convey to children the true spirit of these festival days by the kind of concrete symbols we allow or encourage. These special days have been commented upon in connection with "Costuming"¹ and in the chapter on "Paper-Cutting and Paper Construction,"² but the following paragraphs give one specific suggestion for each holiday for the benefit of those who wish such ideas.

For Halloween an edible brownie may be made by putting together with toothpicks a whole fig for the body, a marshmallow for the face, a small inverted fig for the hat. Toothpicks with currants threaded on them serve for arms and legs, and almonds form feet and hands. Many variations of this idea may be worked out by using different kinds of fruits, nuts, and sweets.

For Thanksgiving one group of children made simple place cards to take home. A sample was sent home for mother's approval, and enough cards were made for each home table if the mothers wished. In one school the children marched in a processional, each carrying some offering of food for the less fortunate, and the offerings were all arranged on an altar to serve as the center of the simple Thanksgiving service.

For Christmas a number of things have been suggested elsewhere.³ In one school each child made a simple low candle-holder containing a candle which he had made in this way: Paraffin was melted with left-over scraps of wax crayon; the children twisted wicks of candle wicking,

¹ See pages 53-63.

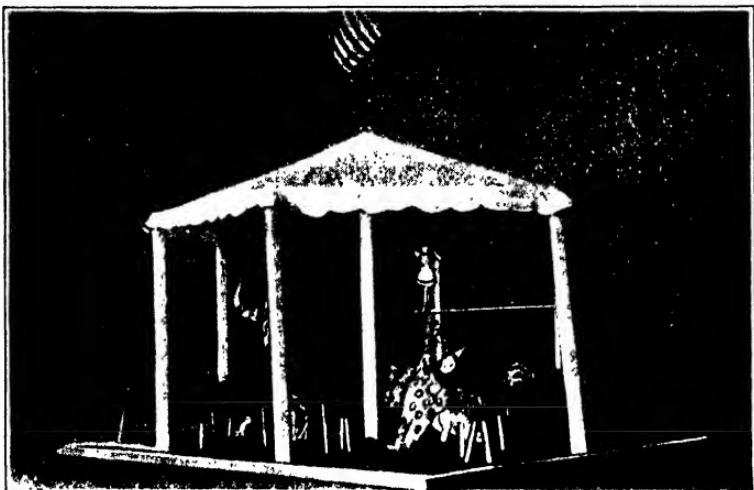
² See pages 135-167.

³ See Index.

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and each child dipped his wick, held by a stick, until the candle was big enough. Bayberry wax may be added instead of the crayon; the bayberry may be gathered by the children or the wax may be purchased.¹

For Washington's Birthday children may make a small, neat base of clay and put into it a small American flag.



CIRCUS TENT

For Saint Valentine's Day a little bouquet of flowers, like a corsage bouquet, may be made. Simple tissue-paper flowers are made after the manner of those described in Chapter VI.² All the stems of the dozen flowers are twisted together and put through the center of a tiny lace doily, which may be made or purchased. An inner fringed doily of green paper makes a pretty background for the flowers. The ends of the stems may be wound

¹ Bayberry wax, and also wicking and directions for candle-making, may be purchased from the Industrial Arts Coöperative Service, Teachers College, Columbia University.

² See pages 157-158.

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with tin foil. More foliage of shredded green paper may be added, if desired, to fill in around the flowers.

On Mother's Day children may make a booklet with pictures cut from magazines, to show all the work mother does for them.

For Easter children may make a single jonquil, using for the center a tube of yellow crêpe paper fluted at the end. The petals are cut in a continuous strip of paper and wound around this tube; and when the stem of thin stick or wire has been wound with green paper and stuck into the end of the tube, the petals are arranged around it, and the whole is tied together with thread or wire. A long green leaf is added near the base, and the flower is put into a small base of clay or into a spool covered with green tissue paper.

The county or community fair may be very interesting educationally. Children may exhibit their garden produce in a school fair, or their handwork, or other results of their efforts. The neat and attractive arrangement of such exhibits should be regarded as a valuable exercise.

The coöperation between towns is an important thought. One project emphasizing this is discussing, planning, and making a tourist camp or park in the sand tray or on a table. Newspapers may be watched for descriptions of camps, and travelers may be consulted for ideas as to what a city should provide for the comfort of the tourist who comes from far away. Such matters as the location of the camp, the beauty and convenience of the spot, and the things to be provided, such as stoves, tables, play apparatus for children, waste-containers, etc., for the convenience and comfort of travelers, — all may be discussed and represented in the table by paper and other constructions.

CHAPTER XI

THE RELATION OF MANUAL ACTIVITY TO THE OTHER SCHOOL SUBJECTS

While the relation of manual activities to other school subjects has been implied throughout, we may call attention here to the special service that handwork renders in clarifying or expressing or visualizing ideas in connection with the other subjects of the curriculum. It is often hard for the adult to realize the haziness, confusion, or meagerness of children's mental images. In using handwork as a means of clearing up such confusion, care must be taken that further confusion or inaccuracy does not result. It is the teacher's responsibility to weigh the values in any project planned.

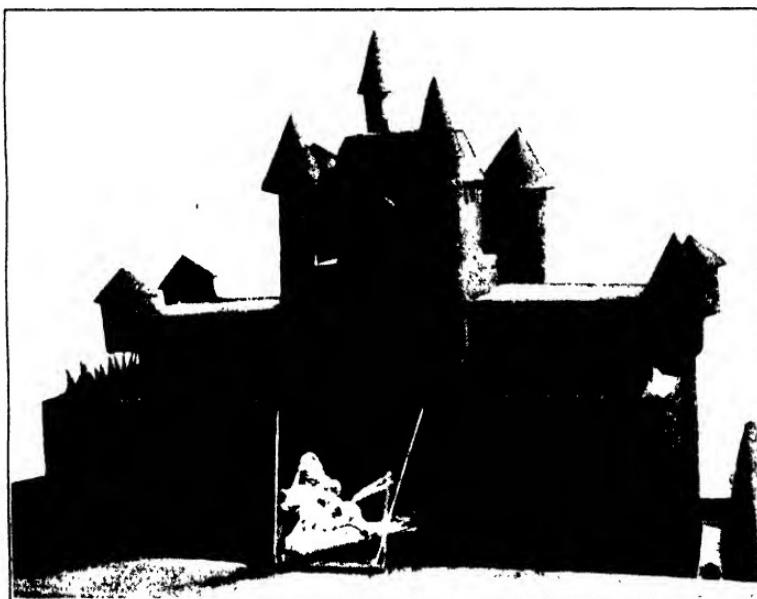
LANGUAGE

Opportunities for oral language in connection with handwork are unlimited. Discussions of plans and results are an integral part of the work, and children particularly enjoy talking about what they have made or are going to make. The varied acquaintance with new materials, tools, and processes adds greatly to the stock of ideas, words, and meanings, and creates an enrichment of mental content from which to draw in both oral and written expression. Opportunities for writing English are afforded the children in connection with labeling, taking down directions they have read or heard, writing up their experiences in any project, and making requests for materials and information while engaged in a project.

THE RELATION TO OTHER SCHOOL SUBJECTS

LITERATURE

There are many poems and stories of industry which will have more meaning for children when they have had some of the experiences upon which such literature is based. The best of such literature should be given to children in connection with their handwork experiences.



CASTLE MADE OF MAILING TUBES AND CARTONS

Children are much interested in illustrating stories and rimes, on sand tables, by play moving pictures, and in other miniature forms. The teacher should carefully decide what the values of such an illustration will be, so that benefit shall be derived from the effort involved. Does this story need clarification through concrete means, or would the children profit merely by working out the problems of expression involved? For example, the story

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of the "Three Bears" needs no clarification, and so the making of the three bears and their house would probably have a dramatic rather than a factual purpose. On the contrary, stories of knighthood may very profitably be



CLAY LIGHTHOUSE

illustrated to give clearer ideas. The story of Cedric may be shown by making a carton look like the interior of a castle, with decorations and furnishings true to type, and with dolls in costume shown in a tableau to represent the knighting ceremony. A whole castle may also be made of cartons, mailing tubes, and other containers put together with

THE RELATION TO OTHER SCHOOL SUBJECTS

brass fasteners. The whole may be given a coat of dark-gray or brown paint sanded, while wet, with coarse sand. The castle may have a spiked wall of cardboard or corrugated paper, and a moat. A drawbridge may be made of cardboard, and made so that the process of lowering and raising may be illustrated.

Some inland children who had heard poems and stories about a lighthouse were unable to visualize the lighthouse and its surroundings, hence it was decided to build a lighthouse on a bit of seacoast in a sand pan. Height, location, size, and general appearance were discussed, and people, pictures, and books were consulted for information. The result was something like this: In one corner of the pan a rocky promontory was built with sand and rocks, and some rocks were left in the water to show the treacherous shore. The water, colored with bluing, was poured into the sand pan, and the water and rocks were flecked with beaten white of egg for foam. On the height of the promontory was the lighthouse. It was built of coils of clay, surmounted by an open chamber containing a small electric bulb, and doors and windows were added. The home of the keeper was built close by. The whole construction served as a basis for the explanation of colored, revolving, and intermittent lights used on the seacoast.

The relation between literature and handwork was, of course, particularly stressed in the discussions of costuming and puppet plays in other chapters.¹ See also the suggestions under "Records."²

GEOGRAPHY

When studying stories of foreign life it is often desirable that children get pictures more colorful and with better perspective than is possible in a flat picture. In connec-

¹ See pages 53, 187-208.

² See page 238.

EDUCATION THROUGH MANUAL ACTIVITIES

tion with stories of foreign life the people and their homes with typical surroundings may be represented on a table or in a peep show, thus making possible a three-dimensional visualization. Closer attention is paid by the children to what is read, or to what is heard or seen, when the problem of making a reproduction is on foot.

A realistic setting for the many jungle stories is in the form of a peep show made in a carton.¹ A piece of real sod is put in the bottom, and into this the other vegetation, such as palm trees, hanging vines, and thick brush, may be stuck. A little mirror or bit of silver paper may form a murky pool, at which several tropical animals drink. Parrots, monkeys, and snakes may be in the trees. These may be made of plasteline or paper. When the carton is covered and lighted by means of an electric bulb in a hole in the top, a very good picture of the jungle may be had through the window in the front. A piece of yellow tissue paper around the bulb throws a lurid light into the scene.

Some beginnings of geographical concepts are found in the discussions of industrial materials and their sources. The study of food, shelter, and clothing in relation to human life is primarily a matter of geography. The study of other times and other peoples in regard to their music, their costumes, their dances, and their literature surely helps to build geographical ideas. Though the subject of geography is not given a special period in the primary school, its importance is felt no less because the stress is incidental.

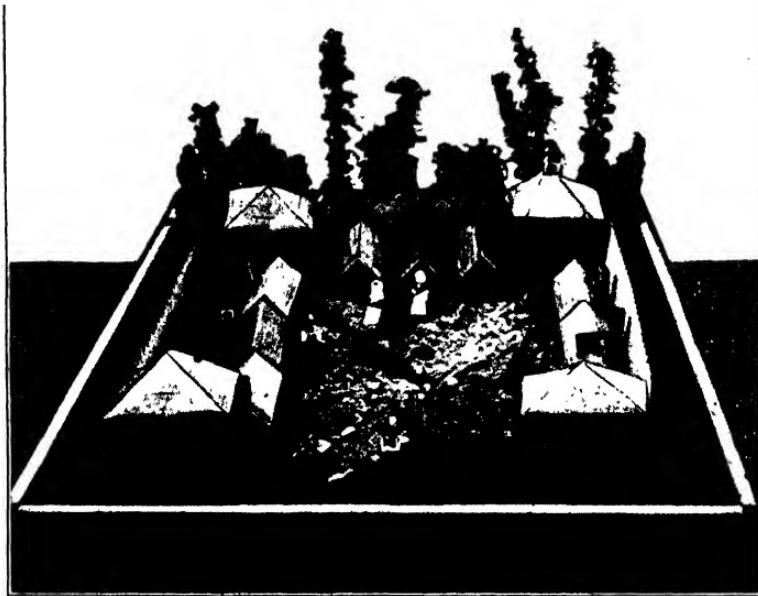
HISTORY

The evolution of industrial processes, and the relation of inventions and industries to the early development of our country, are history subjects touched upon in the

¹ See pages 195-197.

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primary grades. Many scenes of local, state, and national history may be connected quite naturally with primary literature and with special days and occasions, and can be made more concrete when objectified through handwork. Leading the children to feel the change that



PIONEER DEFENSE

A history project in the sand table

comes about through greater adaptation to the environment and through greater understanding of social relations establishes a good attitude toward history, which doubtless will weigh more than exact teaching of the more factual type. For instance, to participate in the life of the pioneer by actually building a log cabin and making woolen cloth from raw wool is to get a feeling for the early settlers of our country that cold facts cannot produce.

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MUSIC

In the chapter on "Making Use of Odds and Ends" many suggestions were given for making crude musical instruments.¹ There are many opportunities to use manual activities in connection with music appreciation. In studying dance forms, such as the minuet, dolls may be dressed in costume and placed in characteristic poses to create a picture of the dance. A series of costumed dolls may be used to illustrate the dances of several nations. The music of the Indians may be shown in its characteristic setting by means of a peep show, or by making crude imitations of musical instruments used by the Indians. In connection with a study of cotton, a Southern plantation scene with the cabin, the cotton field, and the darkies with their banjos may be put into a sand table as a background for the plantation songs. A levee scene may illustrate the source of many of the Southern melodies.

Sometimes when children give a program of music, hand-work may be used to announce or illustrate the numbers. In one such program the children played pieces from the circus; and as each piece was played, the circus animal or band wagon or performing horse or clown was moved across the top of a screen after the manner of puppets. Puppets may be made to dance as some bit of music is played. One boy made a clown which he could make dance cleverly to the "Golliwog's Cakewalk" by Debussy. A group of children also made a moving picture of silhouettes to illustrate the songs and selections which they presented to a group of parents. Sometimes children also make individual moving pictures or picture books illustrating the songs they know. Pictures of instruments may be cut out, faces, arms, and legs added, and playlets arranged.

¹ See pages 170-172; also Appendix F, IV.

HANDWORK CORRELATED WITH OTHER STUDIES
History of shelter (above); history of land transportation (center); dances of different lands (below)



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FINE ARTS

Fine arts and industrial arts are so closely allied in the primary school that they should usually be regarded as two emphases of one field of activity. It is a natural and desirable thing to wish to beautify what we have made, as well as to make things beautifully. It has not been the purpose of the author to develop particularly the fine-arts side of primary handwork, although the æsthetic point of view should not be neglected in manual activities. However, to outline the most desirable techniques and methods for getting children to master ideas of line, form, and color is not within the province of this volume. Hence it seems wiser to commend to the reader some of the books that embody most satisfactorily the best points of view both in the field of child study and in the field of the fine arts. This combination of the knowledge of children with the knowledge of art techniques is absolutely necessary. At the end of this book will be found a list of such publications.¹

ARITHMETIC

There are few handwork activities that do not make use of the quantitative aspect of experience. Whether a child consciously knows it or not, he is almost always measuring surfaces and distances when he makes something with his hands. It is a well-known fact that concrete experience with actual quantities and spaces is necessary before the symbols that represent those quantities and spaces mean much. In handwork there are many opportunities to get number experiences and symbols together in a natural way, so that they will mean something to the child. He sees the need of measuring and counting when something

¹ See Appendix D.

THE RELATION TO OTHER SCHOOL SUBJECTS

he wants to make and own is dependent upon those abilities. Exactness and precision in the comparison of areas, lines, and relative positions are stressed. Children often keep account of the cost and quantities of materials used. Salesmanship and housekeeping budgets may be worked out in relation to the stores, houses, and villages which the children set up.

HANDWORK MUST BE WORTH WHILE FOR ITS OWN SAKE

When handwork is used naturally and appropriately to clarify subject matter, it is a very important aid to learning. However, it is never right to make an inferior, useless, or negligible product merely to bring out some fact. For example, the teacher who had her children in first-grade work make tiny paper furniture for weeks and weeks in order to teach measurement with the ruler not only violated health principles but she probably made some children hate handwork as a whole. The tables and chairs were not usable or pleasing, and probably served chiefly as reminders of hours of tedious measuring. Measurement may be taught through making articles that will be of real use to children. Another teacher, who was anxious to teach the letters of the alphabet, chose the laborious method of having each child make an alphabet picture book, which used up all the handwork periods for six weeks. Each child made twenty-six pages, each with a cut-out letter, and an illustration in cutting or crayon to go with it. The very length of the project seemed out of all proportion to the value of the result or of the facts taught.

**PART III. THE ADMINISTRATION OF MANUAL
ACTIVITIES**

INTRODUCTION TO PART III

The general point of view regarding manual activities and their values has already been summarized, and some criticism of current practice has been offered. It is the aim of this section of the book to discuss such questions as how to make handwork vital, how to equip and buy, how to manage handwork situations and children in them, and how to plan lessons involving handwork.

The detailed reports of projects are offered for the sake of those who wish to see the actual working out of several units of work. It must be remembered, however, that any project is always an experimental procedure depending upon the particular situation and need, and should not be considered a formulated thing that can be used again in the same way.

CHAPTER XII

A SUMMARY OF THE VALUES IN MANUAL ACTIVITIES

SOME DIFFICULTIES IN CURRENT PRACTICE

Incomplete understanding of the needs of young children. School administrators have often spent far more attention and money upon the higher levels of education than upon the lower, seeming to feel that the older the child, the more fully his education counted. The average taxpayer still believes that the older children should have the most money spent on their education. Of course the findings of educational science have quite reversed the idea that underlies such a point of view, for the best evidence now points to the fact that the early years are the years of greatest plasticity and educability. Scientific research has been slow to reach the field of elementary education, but it is most certainly focused now upon the behavior of the *young child*. It is now possible to get help from psychology and psychiatry on the problems of the primary and kindergarten years. Child study and its applications to education are in the very forefront of attention, as is evidenced by the activity of research laboratories in universities, by the establishment of clinics, parent study groups, and classes for little children, and by the large number of writings that are coming from the press on this important subject.

Wrong conception of economy. Many good primary teachers complain that school boards or supervisors continue to buy the handwork materials long since discredited by hygienists and psychologists, and that they are

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unwilling to buy materials recommended by specialists who have made a study of the subject. A poor idea of economy is often responsible for this condition, and also a reluctance to change with the times. However, it is anything but economy to buy materials that do not have real values for children. It is sheer waste of child life and of taxpayers' money to buy quantities of old-fashioned materials when newer and better materials may be had.

Primary teachers have had, presumably, special training for the work with little children. They should have a voice in the choosing of materials. If a school board continues to buy as it always has bought, regardless of the special needs of the children as known by the teacher, then that school board is not making full use of the training it has paid for in that teacher. Many teachers unfortunately are either unable or afraid to explain their objectives to their employers. Much good would come of discussions of a friendly nature, exhibits and demonstrations of materials and of work by the children, to show supervisors and parents how materials may be chosen to fill the educational need best.

Need for vitalizing manual activity. One of the urgent needs in the primary school is a sifting of values in manual work. All too frequently such activity is introduced merely to keep children busy while others are reciting. A very vital kind of handwork can be done during unsupervised periods, but too much of the old treadmill sort is still done. Handwork as now administered has too much repetition both in problem and in technique and not enough steady progression in either. Handwork must be analyzed just as other subjects are, to find out whether a proposed activity offers enough opportunity for the mental growth of children. There must be a realization of the need for a real purpose to motivate each activity.

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Another fault of much of the manual activity at present is the unwillingness of the teacher to allow natural growth to take place. When children are really solving problems their responses will not be uniform and they will not proceed in a correct and predicted manner to arrive at their conclusions. If real thinking takes place, the process may be cumbersome or lengthy or even noisy and "messy." Teachers are prone to hurry over the really educational part of a project and to dwell with greater satisfaction upon the finished result. However, the growth that has taken place in a child is not always shown in the visible product. Parents and teachers often show children how to do things which could be worked out experimentally, or put on finishing touches for children instead of letting children be responsible for their own work. Leading children to think for themselves often means standing by in such a fashion that the learner sinks or swims by his own effort.

The case of George, a five-year-old, is in point. George quickly realized his ambition to make a wagon by nailing four wooden wheels to a soap box. Believing his wagon to be made, he began to wheel it about, only to find that each wheel had its own peculiarity. One wheel was too tight, another too loose, and all the wheels rolled unevenly because they were attached at random instead of at their centers. After puzzled investigation had seemed to bring no solution to the child, it was suggested that he go out of doors and sit where he could see the wagons on the street go by, to see if he could find out how they were made. It was also suggested that he find a coaster cart and examine the wheels. After such observations George returned in great excitement and announced to all that wheels were put on sticks, and were put on through holes in the middle. He went to work to put his new ideas into

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practice. Before he actually cut into the material the teacher asked him some questions to make sure that he had some plans. He attacked with great interest the various problems involved, and probably learned much about perseverance and felt the real satisfaction that comes from creative effort. However, the completed wagon was crude, and was in no way a true exhibit of the growth that George had experienced.

Overemphasis upon the tools of learning. In many primary schools so much is required of children in the mastery of educational tools or symbols that there is little time left for other things. It is a common complaint that there is no time left for handwork, music, or other subjects rich in content and in training value, because there is imposed upon the teacher the tremendous task of getting the children through a certain number of readers a year. Although the introduction of standard tests for measuring the achievement of children in the various school subjects is a wonderful step in advance, it must also be said that one of the unfortunate accompaniments to their use is the overzealous desire to push children to meet the requirements of the tests. As soon as there is a standard set up, the teacher feels an urge to see that her children are not found inferior by comparison. This state of affairs is not in line with breadth of education or well-rounded development.

Special supervisor's knowledge of children essential. Primary-school education is often complicated by the fact that the special teachers or supervisors often know their technique well but know very little about children. This often results in an overemphasis on technique for its own sake rather than for the sake of the children's development. The art supervisor is specifically mentioned for the reason that in many schools she supervises the only

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manual activity on the school program. She ought to know children first of all, and she should know how art impulses and industrial ideas function in the lives of children. She must, through her knowledge of child psychology, be able to adapt the technique of handwork and art to the natural experiences of the children. There is much complaint that the special teacher requires the classroom teacher to work along too many tangents, thus making the curriculum disjointed instead of unified. One teacher in a large, progressive city reports that her children rarely have an opportunity to work with materials such as clay and wood, since the art supervisor requires the first-grade children to make a large number of posters each year. It seems impossible that one can find many real motives for making posters in the first grade. At least we should say that making posters ought not to take the place of the more natural and healthful types of manual activity.

THE PSYCHOLOGICAL JUSTIFICATION OF MANUAL ACTIVITIES

Several instincts prominent during the kindergarten and primary age of childhood need exercise and careful training. One of these is the tendency to be physically active, which demands freedom of body and the exercise of the large muscles, rather than sedentary activity or that which demands a large amount of work with the small muscles. The restriction of handwork to paper and fine weaving has often been responsible for a very unhealthful kind of manual work that is not only artificial and imitative rather than real and vital, but makes for fatigue and nervousness rather than for healthful development of the large muscles. Woodworking and clay-modeling are better activities for normal development.

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One of the important instincts at this time is that of manipulation, another manifestation of physical activity. Children are exceedingly interested in handling materials and things. Whether this instinct becomes a force for good or for evil is entirely a matter of experience and training. It is a native tendency merely to handle, but whether children learn to construct or to destroy depends upon what satisfactions they have been led to enjoy in either case. When manual activity is rightly directed, its inclusion as an integral part of the primary curriculum has an important effect upon the training of this instinct.

Children of this age are also full of the desire to explore and investigate. What better way is there to use this energy than in the wealth of experiences that come in the handling of a variety of materials such as are used in handwork? Children of this age are sensory in interest, for they are in the business of finding out about their environment through their ears, eyes, and other senses. Children whose early life has been stunted or starved in sense experience usually have limitations in mental life because of the lack of properly interpreted experience with things about them. The business of the primary school is to give children as many rich, real, and stimulating experiences as they can personalize or relate to their own lives. Primary education that substitutes for this vital experience the overemphasis upon learning symbols is shortsighted. No amount of mere reading about things can do for a child what the actual experience — for instance, with wool or cotton or any other industrial material — can do.

Children of this age are necessarily more concrete in their mental imagery than are adults. They can therefore be led to reason and think vividly in concrete situations, with materials that can be seen and handled. Reasoning

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merely with ideas or symbols is only beginning at this time, and these ideas and symbols must be derived from real material rather than from reported or secondhand experience if they are to be accurate or rich in content and background. Children can and will think out problems when they appreciate the need of thinking, and this felt need comes closer home when it concerns something children naturally tend to reason about. A child who is encouraged will do very good thinking about the things he makes, and, moreover, the results of his thinking are perfectly apparent. A wagon that does not roll is a poor wagon to the child, and he does not need to be told this fact. How to make it roll is a problem that, under wise guidance, will engage his whole mind.

Children need much opportunity to initiate and be creative. There is great satisfaction in the idea of "starting something," but this something can be legitimate and worth while and still be satisfying. Many children who have a tremendous desire to originate, or to be a cause, or to master situations have no workshop or equipment of any kind on which to expend this energy in a right way, and there seems to be no outlet for them except in mischief or even, in some cases, in criminal activity. The desire seldom abates during childhood; it merely seeks a medium through which it may obtain satisfaction. Motor outlet is natural during this period. Later, perhaps, children can express some of this impulse in a more intellectual way. Motor expression, however, need not be merely aimless or futile movement. A mother said recently that she supposed children were different from what they used to be; that her boy was perfectly content to coast in his coaster wagon day in and day out and seemed to need no other equipment, such as hammer and nails or other constructive materials. When asked whether he had an

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opportunity for more creative play, she replied that she really had no room for such things. She showed plainly that because the child did the only thing he could do to occupy himself she supposed he liked that activity best. Children do accommodate themselves to situations, and in that fact lies a great danger. Mere contentment in children is not necessarily a healthy condition.

SOME OBJECTIVES OF WELL-DIRECTED MANUAL ACTIVITIES

Acquisition of certain appreciations. Intelligently planned and directed, the field of manual and industrial education may change attitudes and foster appreciations of great moment in the child's life. With a background of actual participation in manual activity there may come to the child a point of view about our civilization which is bound to affect his future behavior toward questions arising in industrial life. It should bring about an understanding of the interdependence of all individuals, communities, and nations in the matter of providing the race with the essentials of life. This insight may be a gradual strong growth based on experience, rather than a sudden awakening in adult life.

There should be an appreciation of the tremendous advantages that children enjoy today compared with the advantages of other times. It may also be added that the problems of life have not all been solved. One of the finest attitudes to be gained is that of regarding the life of today as being capable of betterment. It would be untrue to reality and to the spirit of progress to implant in children any feeling of superiority over the life of other days or peoples. Dissatisfaction with the present, or a realization of problems yet to be solved, is indeed the best guaranty

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we have that the world will continue to progress. However, to follow and actually to participate in the difficult steps by which man learned his various arts and crafts is a wonderfully illuminating study, and is especially wholesome for those children to whom participation in actual economic struggle is denied.

The children should also gain an appreciation of the variety of contributions made by countless workers to further the child's enjoyment of life in all its departments. Children should be led to see the manifold skills and abilities that underlie the manual work of the world, and they should be led to admire and to appraise tolerantly all creative effort that is useful. The result should be an appreciation of the impulse toward beauty that may inspire these workers in their work, and there should come to children a desire not only to make things but to make beautiful things.

Acquisition of valuable attitudes. The full use of one's powers is in part contingent upon (1) how the problems of everyday life are perceived, and (2) how the mind judges the comparative values of these problems, (3) how eagerly and efficiently the mind grasps and solves problems, and (4) how the mind relates smaller problems to larger and more inclusive purposes. If these attitudes of problem-seeing and problem-solving are so important, education must concern itself with them at the earliest opportunity. We cannot wait until the child is older. In well-directed manual work children should learn to find purposes for themselves, and play life may be raised to a higher and richer level by showing children how to use their creative energies in a constructive way. A child should get the attitude of self-reliance which is essential to a good character, but self-reliance must be built out of the play life as well as out of the work life.

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The attitude of self-criticism may result from well-directed handwork, because a child can weigh and understand such criticism. A child who is making something can be led to be dissatisfied with a superficial result; first his eye must be led to demand something better, and then some incentive should be discovered or supplied to make the added effort seem worth while to the child. It is not claimed that self-criticism in this field need necessarily transfer to other fields, but at least it can be used here to great advantage.

Acquisition of new interests and skills. A life rich in manual activity of the vital sort provides great safeguards against idleness. The child who knows how to do interesting things with his hands is usually well occupied if he is given opportunity to do such things. Leisure time need not be a source of worry if such children are provided with materials and equipment and are encouraged to use them.

Children may learn much of practical value about tools and materials and how to buy and use them. They may learn to add to their economic resources by doing many things themselves, as well as to save themselves time, material, and money by using and adapting their knowledge in practical everyday situations that call for simple skills with tools and materials. They gain thus a greater background for evaluating the things that they buy and the service which they render or which is rendered to them by other people; hence they have a basis for dealing fairly with the world that labors, having experienced the need of skill in their own lives.

Children may make many things that are worth while as possessions, with some of the skills and abilities developed by means of manual activity. It is a wholesome experience for the child to produce his own toys. There

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is an important relationship between handwork and ownership. To be able to buy is not so great an asset as to be able to make what we want.

Habits of orderliness and care of material and of tools may easily be stressed. Situations demanding coöperation in the use of materials and equipment are of daily occurrence, and for that reason there is opportunity to make this a real and vital attitude. The habit of economy is another by-product of manual work, developed through the countless opportunities for measuring and cutting materials and otherwise planning to conserve or save in their use. The making of a plan or pattern before cutting the material is a good habit to establish, and does away with impulsive or reckless waste of materials.

SUMMARY

It will be objected by some that this book is far too ambitious in its outline of values for children of such tender years. It seems to me that what we need is to establish beginnings of attitudes and appreciations, and to realize that these beginnings must have their foundation in the early years. On the whole, the ability of primary-school children to get insight into the world about them has been greatly underestimated. Their understanding can never be measured by their ability to express. The young child is in the age of hypersensitive sense perception, or unspecialized interests, with an enormous and omnivorous appetite for experience. In the past we have given these young children difficult tasks in the mastery of tools and of symbols, but we have starved them perceptually and emotionally. They need greater emphasis on the realities of life, not to the exclusion of mastering the tools of learning, but for the enrichment and greater motivation of these tools.

CHAPTER XIII

THE ADMINISTRATION OF MANUAL ACTIVITIES

SCHOOL PERIODS CONCERNED WITH MANUAL ACTIVITY

There are three periods in the primary-school program that offer opportunities for manual activity as most schools are now managed. The first is the regular industrial or industrial-arts period, which is a supervised period given daily in many schools, or at least three times a week. During this period the new ideas or techniques of manual work may be developed and taught under the close direction of the teacher. Handwork that needs no direction may be put into some unsupervised period. The time allotted to the supervised-handwork period differs with the situation. It is difficult to imagine a period of value which is less than twenty minutes in length, if material has to be passed out and cleared away. Half an hour is often given in the upper primary grades. Ideally, the length of the period should depend on the type of activity. It is easy to see that, under ordinary conditions, three quarters of an hour of woodworking would be less harmful to children in the first grade than half an hour of weaving. In some schools no time is allotted for directed manual arts. This is a great mistake, for in progressive schools more, rather than less, time is being given. Even the teacher who is hampered by a rigid program devoted to mastery of the tools of learning often reserves a part of Friday afternoon which can be devoted to the manual arts.

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The second school period that concerns manual activity is the unsupervised or seat-work period, made necessary by the fact that one class recites while another class works alone. Other work connected with reading, writing, and arithmetic is often given, but manual activities form a prominent part in the work of the unsupervised period. Of course, our modern attitude toward this period forbids the old type of mechanical unprofitable "busy work" once done, for we now realize that the unsupervised period has great possibilities for training. Especially is there need for understanding the possibilities of this period in the rural school, where each child can receive a comparatively small amount of the teacher's attention. The next chapter will deal with some suggestions for this period.

The third period that has a relation to handwork is the "free" period. It has different names in different schools, but by it we mean the period in which children are free to choose their own activities and carry them on by their own initiative rather than by the initiative of the teacher. In many kindergartens and first grades the work of the school day begins with half an hour or more of this free work. Children are supposed to occupy themselves profitably, but they learn through experience and public opinion what is worth while. The teacher is in general control of the whole situation, but she sees to it that the initiative and responsibility remain with the children. This period has incalculable value from the point of view of character-building, for then children are what they are in reality, not what the teacher makes them attempt to be or to seem.

In schools where children have all three kinds of periods named in this discussion there may be considerable interplay between them. The work in the free period gives the teacher much insight into the needs and interests of

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children. The discussion and actual manual work of the supervised period influence the children's use of the free period. The work that can be finished or worked out without the guidance of the teacher may be done in the unsupervised period with profit and pleasure. The next chapter will deal specifically with suggestions for methods of conducting these periods.

PROGRESSION IN MANUAL ACTIVITIES

When teachers ask, Is this material or that activity appropriate to the first grade? or, What should third-grade children be able to show in the technique of clay-modeling? we have questions difficult to answer. How can we set down measures of progress in the manual activities of children? Before attempting to give any suggestions, let us analyze some of the problems involved.

Different kinds of progression. One may judge a child's progress in manual arts by the amount of control he acquires over materials used to express his ideas, with special reference to the excellence of the ideas expressed. He may show a wealth of mental content, but the technique he employs may be poor. In this case it is necessary to decide whether the idea or the technique is more important to normal development. Again, one may judge results by the child's gain in technique alone. How well is the child learning how to use his material to express an idea? In some cases a child may show wonderful technique but no ideas. He may have an imitative or mechanical technique that has no power or life in it, although to the casual observer it may seem to result in a superior product. Still another measure of development is the amount of self-control, persistence, or other character change shown in a particular child. Another consideration is the devel-

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opment in mental grasp of subject matter and in the appreciations that underlie certain handwork activities. In other words, progress and progression are somewhat dependent upon other considerations.

Manual activities still unstandardized. Probably because of its later entrance into the curriculum, and because of the traditions clinging to its use, manual activity is less standardized and less uniform than other forms of school work. In some schools the whole curriculum is built around it; in other schools it has almost no place whatever. In some schools much money is appropriated for materials, equipment, and special teachers; in others the teacher is expected to work only with newspapers, paper sacks, and whatever materials she is willing to purchase out of her own pocket. Again, there is great difference in opportunities for manual activity. Children who enter kindergarten at the age of four will have had two years of opportunity for manual development when they reach first grade. Children who do not have the benefit of kindergarten training are naturally much retarded, but the whole group has to be managed by one teacher regardless of the children's previous experiences. As the work with even younger children in the preschool groups develops in this country, it is conceivable that the whole range of achievement will be greatly changed and that children will earlier learn the muscular habits or controls of which they are physically capable.

Need of scientific study. Added to the great variations in the administration of manual activities in schools, there are great individual differences in children apart from their experience. At least it seems true that some children have better muscular control and that some have a greater mental tendency to the type of imagery employed in handwork than have other children. The rela-

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tion of skill in handwork to mental ability in other lines is another point that has to be worked out more fully. In other words, many of the problems underlying the use of handwork materials have not yet been solved ; and their solution will not be possible until further studies of the specific elements involved have been made.

The finished product not the best criterion. In looking at the finished work of children one is conscious that it is very unfair to judge children's abilities by the visible results alone. The responses of the children in their discussions of plans, their improvement upon first attempts, and the progress of the project in their hands,—these must always be the bases of educational evaluation. A product certainly has a certain value of its own because of the way it appears when done, but we are discussing the training of children, and from that point of view we have a different set of objectives. A mother once complained because one boy brought home a bird house which she considered crude, while another of her boys, who was in a lower grade, brought home a more highly finished one. The first boy, it was found, had conceived the idea of making this house by himself, and he had worked out the plan and construction unaided. His product was inferior, but his growth had been worthy. The house made by the younger boy had been conceived by the teacher, and each step had been dictated and closely supervised. In a situation where children have constant opportunity to work under wise guidance both in free and in directed work, there will always be a great difference in the finished products, even when made by the same child, because in the former case he is "on his own," and in the latter he is being encouraged or corrected or consciously directed by another mind. The finished result must be judged in relation to the factors that have contributed to it.

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How may progression be assured? Although it is necessary to work out a course of manual activities that takes into account progression of various sorts, it seems wise to do this with great care. The person who is determined to make a stereotyped course for each grade without considering some of the complicating factors involved usually does more harm than good. In the main, each school should adapt its work to the needs and possibilities of its particular situation. Several courses of study have been published, some of which are noted at the end of this book.¹ However, each locality and each group of children has its special needs. There is great danger that a ready-made course of study will be imposed on a school and result in a stereotyped aim to reach certain mechanical or technical goals, and that gifted or skilled children will be held back and slow or retarded children pushed along in order to meet the requirements of too fixed a course.

However, there must be some basis upon which to make, at least tentatively, a progressive course in manual activities. First of all, in any school, the teachers can decide on the basis of the situation as they know it; for instance, what a first-grade child can take with him to the second grade in the way of general habits and special techniques, as well as definite knowledge of certain materials and power of expression through them. Take the matter of paper-cutting, for example. The kindergartner may say that a child in her grade will probably have, as a minimum, a certain number of good motives for free-hand cutting, a certain number of occasions for cutting out pictures, and a certain number of other suitable occasions for the use of scissors. From this minimum of experience she may decide that when the children go to the next grade they will have, as an average, a certain num-

¹ See Appendix C.

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ber of habits, skills, and experiences with certain forms of subject matter upon which their new teacher may count. The kindergartner can put down this list of minimum possibilities as a sort of guaranty, but when she actually sends the children on she may give the new teacher a true and amplified list of these habits, skills, and the knowledge of subject matter gained. If she has developed in the children an unusual degree of skill in any particular, the teacher of the first grade should be willing to build upon that as a foundation, instead of allowing the children to mark time and repeat experiences too easy for them.

If in any school the choice of projects is made on the basis of what was studied in the previous grades, and if each teacher knows what experiences the children brought from the preceding grades and makes good use of this knowledge, there will be within that school both progression and progress on the part of the children. If this plan is first worked out experimentally and then improved upon as more insight is gained both into the lives of the children and into the possibilities of available materials, that particular school may soon boast of a well-made course of study. Any good course of study, in any subject or in any place, has probably been made in some such way. For subject matter and projects of various sorts Parts I and II of this book will give many suggestions. For ideas of what to expect in the various skills Part I will be especially helpful.

What we need most in the field of manual activity is a wider use, with better analysis of aims, and more teachers interested in making tentative courses and projects that are fitted to the real needs of children. With that as a background it will be possible to evolve, perhaps, an interest in learning how to standardize the techniques and values of handwork without making it too artificial.

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THE FINANCING OF MANUAL ACTIVITIES

It is difficult to say how much money should be spent on manual materials in any given school. The situations vary from the one extreme in which no expenditure is questioned to the other in which almost no expenditure is allowed. More and more, progressive school boards are realizing that money wisely spent on the youngest children is money wisely invested for the future. After the necessary equipment is on hand, including tools, it would seem that one dollar per year per child might be named as a low minimum for manual materials. The following suggestions for the careful use of such money should be kept in mind :

The teacher may first find out what materials are on hand and what materials can be purchased by the school at wholesale prices. If the market is watched carefully, it will be found that there are many fluctuations in price, and that when bargains in staple supplies are offered it is wise to buy more than usual. This is especially true of paper, cloth, and weaving supplies, dependent as they are on the cotton situation. The teacher should also investigate the resources at her command in the town in which she is teaching. Often a paper mill or other local concern practically gives away certain remnants or unsalable materials. Another thing to remember is to make use of cast-off clothing or other discarded materials to be found in people's attics. Children will assemble many materials of this sort if encouraged. To make use of substitutes in materials is a part of the business of stretching the budget. Many a teacher has been able to do fine work because she has known how to make use of a cheap substitute when her funds were low. The questions of management in this field are not unlike the problems of the housewife, who can make her household allowance go far through careful planning.

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Teachers could do far more to make their patrons sympathetic with their needs by showing, through exhibits and demonstrations, what can be accomplished through good manual materials. Parents are usually proud of the things made by their children, and through this pride more pressure is often brought to bear on school boards to buy materials. In one school the parent-teacher organization bought tools and other equipment for the manual arts until the school board was able to see the need of it.

The teacher must be careful of materials and equipment if her supervisors are to be generously inclined. She must not allow the children to waste materials or to injure tools or property. She herself must see to it that paint cans are covered, that materials are carefully put away, and that she is worthy of trust in such matters. It is easily understood that some very generous school boards may have reason to be overcareful because of their experience with careless teachers.

Teachers should coöperate by keeping accurate accounts, and by keeping within their allowances as requested. It seems wise, however, not to ask a teacher to state beforehand exactly to the cent what she will need for any particular year. Usually if a teacher is driven to such a course, she will have to protect herself by putting in an order much larger than she needs. It seems wiser to ask the teacher to put in an order for staples which she is sure to require, and then to give that teacher the privilege of spending a certain sum of money for incidentals during the year. However small that reserve fund is, and however careful the account rendered, this is much the better plan. No housewife can foresee exactly what the needs of her household for a whole year will cost. If she were unable to purchase any extra thing for unforeseen, though very legitimate, purposes, she and her family would suffer.

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In the same way the primary teacher is something like a mother with a large family; she too needs some leeway in this matter of expenditures. Many a teacher has spent a goodly sum yearly out of her own pocket because she was refused the money for incidental purchases.

In connection with each activity discussed in Part I of this book suggestions were given both for materials and for cheap substitutes. By sending to school-supply companies for catalogues one will see what materials can be purchased. Samples of these materials are gladly sent by such companies upon request. Prices are subject to great variation from time to time, hence the most recent catalogues should be consulted.

SOME SUGGESTIONS FOR EQUIPMENT

While it is true that a teacher with the right point of view will do better work with little equipment than will the poor teacher with good equipment, still no one will doubt that the good teacher will do much better with proper materials. The specific kinds of equipment needed for the different materials were discussed in connection with those materials in Part I, but a few additional suggestions may be useful when rooms are being equipped.

1. Most teachers do their manual-arts work in the same room with the other teaching. It would be well for the teachers in a school to look the building over for a vacant or convertible room. In many schools a platoon system is used, by which all groups have access at certain times to a room specially fitted up for industrial purposes. Such a room needs plenty of table space, some cupboards both for unfinished work and for materials, a sink with running water, a worktable or bench fitted for woodworking, and a gas plate. The room need not be expensively finished.

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2. When there is no possibility of a special workroom, it is sometimes possible to add certain features to individual primary rooms. A sink with running water, plenty of table and cupboard space, and, if possible, individual lockers for unfinished work and other possessions are very good investments. Much of this can be put in by local carpenters or, if necessary, by older boys or by the teacher and the children. Soap boxes may be collected and converted into cupboards and worktables. Seats that are screwed to the floor are a hindrance and make the full use of a schoolroom impossible. It is gratifying to see that new primary rooms are being equipped with tables and chairs or with movable seats and desks.

3. A cupboard with glass doors is a valuable thing for displaying children's work and also articles lent to the children by parents or friends. Occasionally articles may be borrowed from business firms, if they can be cared for in such a cupboard. If the sides and back of a cupboard are lined with cork board, it will be found serviceable in pinning things up for display.

4. Screens are very necessary to the activities of the primary grades, for making inclosures for dramatizations and for staging puppet shows and the like. The screen made with double-acting hinges is best, as it allows the panels to be turned in either direction.

5. Sand tables or sand pans are needed in the primary room. The various types of these were discussed in a previous chapter.¹ Some well-made toys, such as wooden animals and well-designed dolls, should be a part of the equipment of the primary room, as they stimulate ideas and suggest problems of construction.

¹ See page 191.

CHAPTER XIV

SOME SUGGESTIONS FOR METHOD

THE PLANNING OF LESSONS

The brightest children, the best materials, and the most educative problems may be brought together without good results unless intelligent plans are made. Methods of teaching in this field do not differ from methods of teaching in other subjects, but there is grave danger in neglecting to make plans or in making poor ones simply because of too great reliance on children's natural interest in manual activity or because of the great tendency to focus attention upon the finished result rather than upon the changes wrought in the children.

The following are essential elements in any plan, no matter in what finished form it is written. They are not listed sequentially, because there are so many different types of lessons. The teacher will make up from the list of possible essentials the particular succession of events best suited to the particular lesson she is going to teach. These suggestions have to do with the daily lesson rather than with the planning of the work of a whole unit or a large project.

THE ELEMENTS OF A LESSON PLAN

1. There must be a quantitative objective to be reached in the lesson. This is the statement of the ground to be covered.
2. The teacher must be conscious of her educational

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aims. What is the motive or reason for having this lesson? What contributions will it make to the children's growth in attitudes, habits, knowledge, or skill? What will the children's aims be; that is, to what goal will they try to measure up in this lesson?

3. The teacher must prepare intellectually: by reading, investigation, collecting materials, or by her own experimenting.

4. Tools and materials must be in readiness.

5. The lesson must be planned in units or steps. Each lesson will demand its own peculiar sequence made up of the following possible parts:

a. The introduction must serve its purpose. This may be to create a need in the mind of the child or to provide an atmosphere.

b. The physical factors must be anticipated. These include arrangement of children, their various moves, and the distribution of materials.

c. The teacher must work out the specific ways in which she will stimulate the children. These include careful questioning, discussions, comparisons, incentives, suggestions, comments, and the use of emotional factors.

d. The children's probable reactions and possible ways of dealing with these must be imagined.

e. The teacher must decide how the children may best find out the information they need to have. These means include discussion, observation and excursions, questioning of people, pictures, reading, demonstration, experimentation, and stories told by the teacher.

6. The teacher and the children may decide on what a particular lesson has accomplished and to what further problems it may lead.

We are now ready to discuss more fully some of the elements in planning already listed above.

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SOME SUGGESTIONS FOR QUESTIONING

"The purpose of a question is to serve as a situation which shall arouse to activity certain nerve connections and thus bring about a response."

Sometimes a question is used to recall previous experience. Since this depends on mere memory, recall may be quickly and definitely made. Such a question must not lead to guessing or confusion.

Sometimes a question is used to create atmosphere. An affirmative reply is taken for granted, and the question is a polite way of saying "Let us do this thing." This is a perfectly legitimate type of question when it really serves a purpose, but may easily be overdone and hence become meaningless. Teachers often ask a series of introductory questions to lead up to a problem. If ideas or attitudes are really being built up, this procedure is justified, but unnecessary questions serve to dull children's interest at the very start.

By far the most important type of question is the one that presents a problem for solution, provoking thoughtful responses. There are good and poor questions, and some of these may be compared here.

Suggestions for thought-provoking. 1. Do not ask a question that is too comprehensive or that deals with more units of thought than a child's attention can take care of at one time. Instead of asking, "How shall we make our baskets?" the large problem may be broken into smaller units dealing with the material, the size, the color, or other factors. An example of such a question is, What shall we make our baskets out of? or What is the very first thing we must do to make our baskets?

2. Use language a child can comprehend. In the question How do these two baskets compare? the word

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compare may mean nothing unless the child has been taught the use of the word.

3. Sometimes a child understands what is asked, but has not the facility to make a verbal response. Usually the teacher can restate the question to take care of the child's limitation in vocabulary or can give the child a chance to show in some motor response what he has in mind. She can tell by the lighting up of the child's eyes when he has an idea and can then help him to express it in one of several ways.

4. Do not suggest the answer to your question in the asking. We teachers are prone to suggest by tone of voice or by manner how we feel, and children are quick to catch such a hint. Again, we suggest an answer by the wording of the question. Why do people wear hats with brims on these hot sunny days? is a leading question; it would be better to ask, "What kind of hat is best to wear in summer?"

5. Do not ask unnecessary questions or obvious questions or questions to which children may chorus "yes" or "no." Unless a question is a stimulus to a child's intelligence, it should not be asked.

6. Do not ask questions that lead to aimless guessing. A thought-provoking question usually brings a variety of responses. These responses should be evaluated somewhat, so that the children who made them will understand why they were good or bad. Many times there is much wild guessing until some child accidentally hits upon the answer which the teacher wants. There has been little real thinking done, for the mental activity has been of the guessing kind. When a good question is asked, most of the children understand its meaning; and the responses, however erroneous they may be, show attempts to solve the problem. In that case, even though no child

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can solve the problem, there is enough mental activity present for the right solution to be appreciated when the teacher finally tells the children what they did not know.

7. Make a question as personal as possible. What shall we do next? is often better than What must be done next? We may also add more individual incentive to a question by using some appeal to native interest, such as Who can think of a better idea? or Who will be the first to have an idea?

8. The teacher's manner is important in the asking of questions. An earnest, direct manner that creates an atmosphere of felt need is necessary. A half-hearted question is never a stimulus to thinking. See that all the children are ready for the question, and that the idea takes hold in their minds. If it does not, perhaps it will need some restatement or amplification. Allow time for children to think. You can tell by their facial expressions whether or not they are doing so.

THE DISCUSSION

When certain problems or questions are being discussed by the group under the guidance of the teacher, or when results are being compared or criticized, there are certain factors that make for the success of such discussions.

1. During discussion periods children should be so seated that participation in the conversation will be natural. Sometimes children may be brought nearer together to make a more unified group and to give them a better opportunity to see what is being shown or demonstrated. The children who speak or demonstrate must stand while speaking, so that all may hear and see. The more socially responsive the group is, the freer the discussion is likely to be.

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2. Children, especially the younger ones, should not have attractive or distracting materials near them to keep them from listening. As a rule, the youngest children cannot be expected to give attention when all their materials are before them to handle. Teachers must also be ready to give their full attention to the conduct of the discussion instead of running about gathering materials that should have been ready before.

3. Children will not enjoy group discussions if certain individuals are always chosen to respond and if the conversation is monopolized by the brighter children. The skillful teacher sees to it that all the children are drawn in, and that all the children regard courteously the suggestions made by other children.

4. The teacher, acting as chairman, sees to it that children do not get too far away from the point. She leads them to summarize often, or to restate the question. She will also need to influence the children to use real judgment rather than mere prejudices. The statement, I like John's plan, may need to be followed by a question such as Why do you like John's plan?

THE PASSING OF MATERIALS

Materials must be passed as quickly as possible if too much time is not to be taken from the lesson. The teacher and the children ought to discuss the best ways of passing materials of different kinds. When the procedure is analyzed into a series of movements, and efficiency and time-saving are thought of as problems to be solved, there will be a surprising amount of improvement. Children like to show their ingenuity in working out such schemes. Some of the ways of passing materials are these:

1. Sometimes the monitor idea works well if there are

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rows of seats. The first child in the row is responsible for passing back the materials in a cupboard or placed on his desk. The monitor is made responsible for a given unit of work.

2. Sometimes the child in the first seat takes a piece of paper from a lot and passes the lot to the second child. He may take a pair of scissors from a box and pass the box on.

3. Sometimes children beforehand put all the materials for one child upon a paper plate or other receptacle.

4. Children may have boxes labeled with their own names, and kept in a cupboard. Each box may contain a supply of staple materials. This would still necessitate the passing of some materials but not nearly so many.

5. Sometimes children are commissioned to go to cupboards or to other bases of supply and get certain materials for themselves. They may do this somewhat in cafeteria style. Children who have been speedy without being selfish or rude are to be commended.

Materials must be cleared away as efficiently as they are passed. Here again the whole group may decide how this is best done to avoid confusion and to save time.

PROBLEMS OF CONTROL

When children are not listening to the teacher or to other children, there is no reason why they should not be somewhat informal in manual activity. There is a certain amount of social give and take that is very beneficial when the privilege is not misused. If the atmosphere is not conducive to earnestness and good effort, the children and the teacher must together talk the situation over and make such regulations as are necessary.

It is not right to discriminate against all noise, for noise is often necessary to good handwork. It is better

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to decide whether or not the noise is pertinent to the situation. For instance, children ought not to try to raise their voices above the noise of woodworking tools excepting when necessary. Conversation should be reduced to a minimum in such situations. Sometimes certain children cannot accomplish much if allowed to talk with other children while sewing or modeling. Such children may need to learn how to use their social privileges more wisely.

The teacher should be able to judge whether or not there is the wrong kind of atmosphere in a handwork situation. She needs to have some signal for getting the immediate attention of the children whenever she needs it. Whatever the signal is — a spoken word, a triangle, gong, or a chord on the piano — all, without any exception, must attend to it immediately.

SOME EMOTIONAL FACTORS

Whenever a person makes something, that thing seems a part of him, and he has a definite feeling regarding it. It is difficult even for the adult to be wholly unprejudiced or indifferent to what others say about the results of his creative efforts. Feelings count tremendously in manual activity. A child will destroy or hide away his handiwork rather than have it unappreciated or ridiculed. Children will not feel free to express themselves unless there is an absence of repression and of unsympathetic criticism. The teacher must contrive to maintain a free, happy spirit in which all effort is sincerely dealt with. Children are very quick to discover that the teacher regards certain children as talented and certain others as lacking in talent. *A feeling of inferiority is detrimental to expression.*

Sometimes a study of the emotional traits or situations

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in the cases of certain children will yield great rewards. One child seemed completely apathetic toward all expressive activity. She would not even choose between two activities, so little did it matter. The teacher devoted herself to this child and deliberately chose a problem that she felt sure would be of interest, supplying all the spirit and ideas for a while, but the child remained unmoved. The teacher paid no attention to the apathetic attitude but pretended that there was interest, and even that the child had contributed some of the ideas. She finally surprised the child into doing some of the work on the article. From the first moment that the child believed she had accomplished something her whole attitude changed. She was feeling satisfaction and power for the first time and hardly realized how the teacher had helped. From that time on the child was eager to do as the others did.

As soon as a child has made an article, that article becomes a possession. He feels, if the article is vital at all, an emotion of joy in owning or in having been a maker. This feeling is natural, and the child is being quite logical when he clamors to take the article home. He wishes to put the thing to its intended use. Many teachers fail to regard seriously this insistence of the children on taking this or that product home, but it should be remembered that if teachers continue to deny children's desire to carry out the very purpose for which the article was made, children will soon become resentful or apathetic. In a visit to one school we found a row of hammocks and other woven articles hanging on the wall. The children, when questioned, said they had made them several months ago but had never played with them. This teacher was using the children's work for exhibit purposes only. Of course it is not possible to allow everything that is made to be taken home. Children soon understand that clay is

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returned to the jar to be used again. It is also unwise to allow things to go home that do not show children's best effort. A rule that only the best work is to be taken home can be made a strong incentive for better work.

THE USE OF IMITATION

While no one denies the great value of imitation as a means of learning, the teacher needs to put much more emphasis on individual initiative, since it is more likely to suffer from disuse than is the power to imitate. It is not that we must always ask for something new because it is different, but that we must get a maximum of independence and originality in order to establish an attitude and a mental habit of selection. Imitation we may have, but it must be reasoned, selective imitation and not the wholesale, blind kind.

We must not put a model before a child too soon, so that all individual ideas cease. In some cases a finished article shown to the child will stop all creative effort or will tell him all that he should find out for himself. When a child has expressed his own ideas somewhat, and is familiar with the problems involved, then models may be very useful to enrich or improve those ideas. In that case the child looks at the finished product with definite questions in mind. When two children make things exactly alike, the teacher may encourage the dependent child to make his different. Children soon feel a contagion of invention and originality if the teacher creates the atmosphere of expectation that everyone can think of some original ideas. Of course we cannot expect a great degree of originality in little children, for experience and a fund of ideas are necessary as a background, but the habit of independence may certainly be cultivated by approving

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of individuality rather than of uniformity. Nor do we wish always to commend the child who has flashes of ideas but who does not work them out. Originality in that case needs persevering expression.

DOING WORK FOR THE CHILDREN

Teachers and children need to be honest about work done by both. Sometimes children take home work that they pass off for their own when teachers have done part of it for them. If teachers see to it that children undertake only those things within their power to plan and make, then children should carry out their part of the responsibility and finish what they have begun. It would seem unwise for the child's own good to allow him to leave his work incomplete, and it would be still worse if someone else stepped in to finish it, except when, as an act of kindness, another child finishes a Christmas gift started by a child who has since fallen ill. Occasionally the teacher does something for a child in a similar emergency, but in such cases the situation should be talked over and understood.

In many handwork problems there is an occasional bit of work that is too difficult for a young child to accomplish. This bit of work is comparatively unimportant in the problem as a whole, so the teacher does it herself. This is perfectly legitimate if the children do not think they have done it themselves, and if they observe and understand the teacher's work. For instance, in the making of a ringtoss game, the little children sometimes do not bear down sufficiently hard to bore the large hole deep enough. In this case the teacher adds her weight to press down the tool. The children have had the benefit of working out the entire problem up to this point. Sometimes

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when the use of a sharp knife is required in a piece of work, the teacher does the cutting herself rather than allow the children to risk injury, for a sharp knife is not a safe tool. It is, then, quite legitimate for the teacher to supplement the children's strength with her own occasionally, but in that case the children are aware of the situation and should be intelligent about it.

STAGES OF DEVELOPMENT IN EXPRESSION

In general, children pass through certain stages in their mode of expression, although there are no fixed boundaries between these stages. In the main, the first reaction to a material is manipulative. The child is content merely to handle and to be satisfied with the activity for its own sake. Ideas are not necessary. Anyone, in beginning with a new medium, engages in some merely manipulative behavior; the younger the child the longer he stays in this stage.

In the second stage the child uses his medium of expression in a symbolic fashion. He lives in an experience of the imagination and, while doing so, his drawing or clay changes character. His interest is not at all in form, but the material serves only as a symbol of the idea which he is dramatizing. For example, a child is drawing. He starts with a line and continues moving his crayon, extending the line into curves and convolutions. The finished drawing suggests nothing, but on hearing the child tell about it one gets a whole drama of events. The crayon symbolized a snake which went here and there and everywhere on the paper. The child was simply making symbolic use of his material. Children in this stage of development must be encouraged to express freely and richly, but technique is scarcely to be mentioned during

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this period, which is supposed to be at its height at the age of four years. This period is important for development.

The third stage is one in which true form is attempted. The child is now trying to make a snake which really looks like a snake. In this stage technique is wanted, and a certain amount of it should be taught. Gross errors may be pointed out, such as overcrowding, or omission of parts, or lack of proportion between objects. In this stage the child makes what he knows is there rather than what any particular view of an object shows. Three sides of a house are shown in one picture, with both inside and outside, upstairs and downstairs, in one view.

The fourth stage is one of true representation, when children appreciate simple perspective, light and shadow, and other elementary principles that have to do with picturing a particular view of a thing.

Many people disregard the first three stages and proceed with all children as if they were already in the fourth one. In no grade will all the children be in any one stage. This is bound to be an individual matter. Freedom of imagery is of greater importance in the early stages than is technique. Teachers will do well to keep these stages in mind when observing individual differences in free expression among children.

TYPES OF MANUAL ACTIVITY

The first lesson with any material. In almost every instance when children are using a material for the first time they will require some time for pure investigation and experimentation to allow them to discover what the material is like. They need to become physically adapted to it, and they cannot do this if the teacher plunges them immediately into a problem. It is not urged that children

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be allowed to do anything they please, and it is often necessary to give such directions as will insure the proper care of tools and materials. For instance, absolutely unguided first efforts with a saw may be dangerous, and a whole box of water colors may be ruined at one sitting if certain advice is not given. The point is merely to avoid imposing a definite problem at the first experience, since the children's attention will be upon other things.

The unsupervised or seat-work period. During periods when the teacher is busy with one class the other children need to take care of themselves. The earlier type of so-called seat work was limited to mechanical or artificial work that was a mere time-filler, but the modern point of view regards this period as one of educational opportunity, and therefore chooses activities that have value for mental growth. Such activities as making yards and yards of paper chains, the outlining of words with pegs, the tracing and cutting of paper animals, have given way to more fruitful activities. Making clothing for real or paper dolls, weaving with real textiles, working in clay and other materials suited to free expression, are some examples of this freer type of work. Many individual projects may also be carried out by children if the discussion and initial plans are made with the teacher's guidance during a directed period. Children may work out experimental forms of things during this period after a discussion of the possibilities, and these results may be discussed later in another supervised period.

The work done in the unsupervised period should be noticed and used. The busy teacher often finds it difficult to do this, but it must be done if the period is to amount to anything. A quick round of visitation will be better than asking children to put work away uncriticized. Occasionally there may be an exhibit of the things made.

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In the old-fashioned school the children always sat still in their seats throughout the unsupervised period. They were not allowed to move about freely. This idea has passed away along with other artificial ways of managing children. Children often do very interesting things during the unsupervised period, such as working in a sand pan, reading in a library corner, or working quietly on the floor with toy furniture and dolls. This becomes an exercise in self-direction which is very valuable in itself, besides giving children more healthful activity. If children are really to carry out plans by themselves, the materials must be accessible. Cupboards should be within reach, and children should know how and where to get things quietly. Children and teacher together should agree upon how much freedom in moving about is necessary, and upon what will disturb the reciting class. Both the self-control that children working without the teacher's direction can acquire and the self-control that children reciting can exercise while other children are at work in the room are the results of training. Teachers are frequently more easily disturbed by noise than are children. However, quiet must be maintained for the reciting class, and the more noisy activities are, of course, out of the question. It will be well for teachers to experiment with the children under their control to see how they may be taught to enjoy the use of freedom when self-control is made worth while.

The free lesson or free period. In this type of period the teacher is supervising the entire situation, while the children are choosing their own activities and are carrying them on by their own initiative. These activities are not limited to the manual kind, but handwork does form an important part of the work chosen in this kind of lesson or period. Many schools give a definite period to this

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free work daily or several times a week. If a teacher does not find a time to devote to it regularly, she may devote an occasional period to it. This free work has great possibilities for character development, as children under wise guidance may learn to become good citizens in the life of the school community. There is a chance for real situations to arise, owing to the interplay and clash of the many personalities of the group, and public opinion may play a very important part in developing right attitudes.

For use in this free period materials must be accessible to the children, practically any good material or equipment that is commonly used for expression being useful. The house and the playhouse, the school corner library and the grocery store, tables with clay, sewing materials, crayon and paints, the sand table, building blocks, and woodworking materials may be used. Supplementary reading material, number and word games, paper for writing, and other materials connected with the subject matter may also be used for older children. The idea is to allow the child to choose his activities from as rich a variety as possible.

Usually the children and the teacher together make the regulations governing this period as the need arises. In the ordinary situation the following standards are agreed upon finally: first, children must learn to occupy themselves with some good purpose; secondly, the children must not interfere with one another's comfort or progress; thirdly, the rougher or more gymnastic play with balls, hobbyhorses, and the like must be left for outdoors or the gymnasium. Certain rules of cleaning up and coöperating in various ways are set up as time goes on. The whole is a slow but sure growth, organized by the children rather than by the teacher. What consti-

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tutes profitable work often needs to be discussed. Habitual idling or mere sampling of many activities without settling down to anything may be discussed and criticized by the children. Occasionally they may show what they have made or are making.

The method of the teacher during the free period is one of indirect guidance. She steps in when her own experience is needed to supplement that of the children, but she does not destroy the child's self-reliance by taking the initiative out of his hands. Good questions, stimulating suggestions or comments, and the use of comparison and observation when needed are her instruments. She may make a suggestion which a child may follow or not, and she may also make a request or state a command which the child knows must be followed.

The teacher must set up usable standards for judging the children during this period. She may judge the type of problem chosen by an individual child, how the type changes as the child develops, and how the child grows in power to execute. She may watch the growth in the child's social responses, — how he gets on with others and assumes his responsibility as a member of the group. She may see that in some cases there is only a nervous, restless activity, with little purpose but much movement, and that in other cases there is too much or too little impulse of leadership. One child may repeat and repeat an activity without any progress day after day, and another may choose the same material day after day but develop greatly by means of it.

The progress of children during the free period depends in large measure upon the importance of this type of education in the teacher's mind. Under poor direction it may degenerate into an aimless period of little real worth, or in the hands of an overpowering personality it may

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resemble a directed period in which children are not free after all. The teacher who tries to put herself into the children's problems, seeking to understand them and their motives, will know when to step in, when to stay out, and when to supply some suggestive picture or other bit of material. In other words, she will be a guide in the true sense.

Free expression with a certain material. Sometimes the teacher gives all the children in the group a certain material, such as clay or crayon, and allows them to express their ideas freely. All through childhood there should be abundant opportunity to play with such materials and to symbolize a wide variety of ideas by means of them.

Children cannot be forced to express themselves freely; they must want to, and therefore the teacher must create a spirit of enjoyment that releases the imagination. She must see possibilities in crude beginnings, and should use positive rather than negative criticism. The truth can be told, but it must be told sympathetically if freedom is not to be sacrificed. Technique develops only gradually, after children feel at home with the medium of expression. In these early years freedom of the imagination is the more important aspect, and must precede conscious technique. Children should express copiously and live richly and fully during this period. A child with this background will have a better chance to find his own powers than the child who has been taught a few very definite and fixed techniques which tend to bind him rather than to free his imagination.

Sometimes supplementary materials may be brought in with great profit. In one case, when some children were making drawings to resemble flags, the teacher brought in a book of colored flags from the library, and also some sticks and tacks. Flag-making assumed great proportions

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after that, and some interesting designs were made. Again, when some children were making doughnuts of clay, a plate was brought in, which stimulated the children to put the best doughnuts on it, and to make more of the "good" ones to make the plate look well. The clay bakery thus got its start.

Often children are asked to give definite expression to their ideas upon a certain subject. This is a perfectly legitimate procedure, provided one does not insist that all the children express ideas whether they have any or not. Sometimes a child has a good reason for not wishing to express ideas on a given subject. One did not wish to draw pictures of things to eat, as was suggested. By questioning it was learned that the child was suffering from indigestion, and hence naturally was not interested in food. To ask children to draw pictures about their vacation when their ideas about it are very vague — as in the case of children whose vacations were not notable in any way — may bring very little response. True expression cannot be forced from such unwillingness.

The problem lesson. The problem lesson forms one of the most frequent and important types of lessons. In it some problem of construction or arrangement or other phase of manual activity is worked out step by step under the guidance of the teacher. Problems may arise in several ways. The material itself may suggest one. For instance, a starch box may suggest the making of a wagon. The problem in that case will be to decide what other materials are necessary, and how to make them into a wagon that functions properly. Children may often find materials that are suggestive of plan or purpose and that lead to the solving of problems. A second approach to a problem-solving lesson is the need that is felt by the children or the teacher for some piece of construction.

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For example, the need of clothing for a doll will stimulate ideas of how to make that clothing; the desire for a toy may lead to the solving of the problems involved in the making of such a toy.

In planning for a problem lesson the teacher must anticipate the possibilities of the problem, both as to the materials needed and as to the probable responses of the children to the various difficulties that will arise. She must plan how she will ask such questions as will stimulate thought, how she will encourage the children to give a variety of ideas for the solution of the problem, and how she will enable the children to try out their ideas as far as possible in order to evaluate them. The general suggestions for planning, questioning, and discussion given earlier in this chapter are particularly applicable here. She must also decide when comparison of results is valuable, when observation or an excursion is worth while, and when the children need definite techniques taught them if they are to work efficiently. One of the most important benefits of this type of lesson is that the child may get an attitude of mental alertness toward problems of this concrete type, and he may see the actual testing out of his thinking.

Two problem lessons will be sketched briefly to show two different plans of working out problems. In the first case the problem was to make some sort of basket or bag in which to carry nuts and leaves home from the woods. After the first discussion of the need of such a basket the children were asked to take paper and pins or paste and make whatever baskets they could. This showed the teacher what the children had in mind. In the case of children who had no ideas some small articles were put upon a piece of paper and the children were urged to do something to make the paper hold the things. Thus sides

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were crudely put up or the paper was wrapped around the articles. When the children had roughly made some baskets to show their ideas, the teacher suggested that they look at all the baskets and talk them over. This discussion made the children critical. Questions to stimulate thinking were asked, such as, "Who sees a basket that would be very good to carry in the woods?" and "Which of these two baskets had you rather carry, and why?" Small articles were put into some of the baskets to demonstrate their fitness or unfitness for service. Some were too shallow, some too narrow, some too deep, and some were very uneven. Then the teacher suggested that, since many things had been learned about baskets, the children might get more paper and make better ones. Several children were asked how they were going to improve upon their first baskets. After getting new and better ideas in this way the children made better products than before. In most cases they were encouraged to be pleased with improvements and to be self-critical.

The second type of problem lesson is used where children have no background for the problem. Most children are familiar with the idea of baskets in general, but with the idea of making a running-wheel the group in question had had no experience; in fact, it was thought that they did not even know what a running-wheel was. The teacher began her work by showing the children a wooden wheel, asking, "Can you think of any way that we could make something out of this wheel that would be fun to play with?" Several children had ideas, one of which was to play spin the platter with the wheel; another said, "We could make a wagon if there were more wheels." The teacher said each child was to have only one wheel. The children seemed to be thinking earnestly but no ideas came, until a child caught sight of a stick which the

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teacher had brought with her and put in the scrap basket. This child said one could put the stick on the wheel and then spin the wheel around on the stick. The teacher asked if there were other things they could do with the wheel when it was on the stick. One child said it could be pushed on the floor.

After the idea of making a running-wheel was grasped, the teacher asked where the wheel could be put on the stick. For experimental purposes the teacher had provided cardboard circles and thumb tacks, and one child was asked to pin a circle to the stick. She put the tack in at random, far to one side ; but when she tried to push it on the floor, the wheel rolled part way and then stuck. "Wait, I'll fix it," she said, and loosened the tack, thinking it too tight. The teacher allowed another child to try, and he put the tack nearer the center, quite by accident. The wheel rolled better, but unevenly. The children were much interested in this problem.

The teacher asked which of the two wheels would be the better to play with, and the children at once agreed upon the one in which the center of the circle was more nearly reached. Then a child tried to place the tack still nearer the center, and the wheel was found to roll easily, another child saying that it was good because the wheel was on "in the middle." This fact was at last established : wheels are attached at the center. The children examined wagons and found it was true in every case.

The next problem was to find the center of the circle. The children said it was easy to find the center by pointing with the finger, but the teacher said there was a sure way to find the center that would be fun to know about and which could be used again and again. She let each child draw around his wooden circle, cut out the pattern, and fold, first one way across the center and then the

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other way across, dividing the circle into quarters. On opening this paper circle the center was the point where the creases crossed. Each child found the center of his own wheel and marked it.

How to attach the wheel to the stick was easily solved by the suggestion of nailing, for the children had used hammers before. A child put a short nail through the center of a wheel into the end of a stick, but the wheel rolled off easily. Then a longer nail was tried and the end of it clinched on the back, but the nail was so tight that the wheel did not roll well, so someone suggested making a hole. The brace and bit were then introduced, and their use explained.

When the nail was again put through the wheel by means of the hole, it was found that the head of the nail went through the hole. Various ideas were suggested for keeping the wheel on the nail, among them putting something under the head of the nail. A small tin cap was supplied to take the place of the "piece of tin" suggested.

This problem of making a running-wheel was worked out, as outlined, with five-year-olds, and required for the discussions and experimenting, making and painting, six periods of twenty-five minutes each.

The coöperative lesson. Many lessons are of such a nature that individuals or committees of children may be made responsible for carrying out parts of a plan worked out by all. The special task of the teacher in such a lesson is to see that each child has a job and feels responsible for it. Here is an example of such a lesson: A group of children decided to furnish a grocery store in a corner of the room. There was a general discussion to solve the problem of how many counters were necessary, where they were to be placed, and the like. Then the children decided on a list of definite tasks that would

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have to be done. Children volunteered to do these, and the teacher saw that all had jobs to do. Under the encouragement of the teacher the group decided also on certain regulations in the use of common equipment and in conduct. When the children went to work, the teacher saw to it that all the children were doing as they agreed and were accomplishing results. One child swept out the corner, others arranged or built shelves of boards and old boxes, some made paper money, and others cut out pictures for show cards and other advertising.

The teaching of a definite technique. Often, in any good series of problems, there comes the necessity of showing the children how to do something they need to know about, but which on the whole they cannot find out by themselves. Then we may have what used to be called a dictated lesson. Today we have reduced the number of such lessons to a minimum, because we find that children can work out many problems of technique experimentally. In the old days the children were told to fold here and cut there, and sometimes they scarcely knew until the end what they were making. The child's intelligence was not used. That is why we find occasions for a purely dictated lesson much less frequently than formerly.

However, today we first make sure that there is need of teaching the proposed technique, and then we make the child feel the need of learning it. For example, a child is taught how to use stick prints in a definite way because he needs to know and knows that he needs to know. Again, when children wished to make doilies for a party, they could not think how to make round doilies scalloped. The teacher then had a directed lesson, showing them how to fold the circle into sectors and how to cut the rounded scallop evenly. The children watched the teacher and then tried it. The teacher must decide whether a

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piece of technique is needed, and then she must plan her lesson with the idea of seeing to it that the children learn that technique well. Strict attention must be given to demonstrations or directions, and those children should be commended who most readily grasp a new technique and use it efficiently.

A lesson for appreciation. Sometimes a lesson is designed purely to give the children some appreciation of a process or idea or principle; that is, to change children's feelings and understanding. One such lesson attempted to make the children conscious of the prevalence and worth of design. The teacher brought together pieces of dress goods, embroidered articles, samples of wall paper and table linen, books, shawls, in fact a wide assortment of things that were ornamented with some kind of applied design. The children discussed how much they liked them, how some designs were in borders and some over the whole piece, how people had made these designs by trying them out and then changing them. They looked around the room and pointed to anything that was ornamented with design, and they enjoyed picking out the patterns and ideas they saw. They looked at their own clothing and found much in the way of design there. This lesson seemed to have helped considerably to enlarge the children's ideas, for when they took up stick prints soon afterward, they were eager to invent patterns and designs to use in making doilies and runners for the playhouse.

In conducting a lesson for appreciation the teacher needs to stimulate the senses of the children and to awaken feeling rather than give information only. She must seek by her own appreciation to predispose the children in certain directions.

The excursion. The excursion is so valuable an aid to learning in the primary school of today that some space

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should be devoted to it as a type of lesson. When an excursion is undertaken, the teacher must see to it that the owner of the property to be visited has given permission and that his wishes are strictly observed by the children. The children should be taught to show appreciation of the privilege of visiting, by being helpful and by saying "thank you."

An excursion may be taken with the idea of seeing as many things as possible. In this case the children have general goals in mind and are on the alert to observe all that comes their way. At another time the children may have a definite goal in mind,—to see how a particular thing is done. In that case they should come back with some definite material on the subject. It may be added that it is a mistake to tell children just what they are to see, thus robbing the situation of its element of curiosity. Having a goal to stimulate mental activity is what is needed.

Children need opportunities for talking over and interpreting what they have seen. The teacher must remember that there are many ways of expressing ideas, and that children may have good reasons for preference. Sometimes teachers wear children out by demanding that they draw pictures immediately after they come back from every excursion. It is often the most delightful thing to do, and children sometimes find it a good medium for fixing and interpreting their mental images; but many other activities are useful, such as conversation, dramatization, and expression with paint, clay, and other materials, all of which should be considered.

CHAPTER XV

SOME PROJECTS OUTLINED

The following projects have been outlined to show how a large unit of work is built out of the experiences surrounding a particular subject or problem. The way in which handwork is used to further the project, both for its own sake and for the sake of subject matter, is shown. The use of the many different types of lessons discussed in the preceding chapter is shown in these projects as they are integrated in a whole, and as each type best serves to further the progress of the children. A large unit of work is desirable, because of the wider relationships and the larger scope of thought that children can get from it. When children have only isolated lessons, they lose the chance to get a wealth of related, connected experience, through which to unify their living.

Many kinds of projects have been suggested in earlier chapters of this book. Here only one detailed report has been chosen for each grade, with the exception of the third grade, for which two are given. These projects are no better than dozens of others, but they happen to have been successful and worth while in my experience.

PROJECT I. THE LIBRARY (KINDERGARTEN)¹

Purpose. To establish a play library in a corner of the room.

Aims. (1) To encourage interest in books; (2) to provide a stimulus for coöperative behavior; (3) to begin

¹ This project was worked out with senior kindergarten children in October.

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the formation of good library habits; (4) to develop a sense of responsibility in the care and handling of books; (5) to foster an interest in bookmaking.

These children enjoyed looking at the picture books in the room and, although they themselves did not think of a library, the teacher knew that they could enter into the spirit of a project of this sort.

Plans for working out the project. 1. *Introduction.* This took the form of a conversation which centered around the following questions :

- a. Where could we go to find more books to look at?
- b. What are libraries for, and what do people do in libraries? This preliminary discussion showed the teacher what the children already knew about libraries, and stimulated their imaginations concerning them. Some of the children reported visiting the public library with their parents or older sisters or brothers.
- c. How could we find out more about a library? It was suggested that we visit one. The college library in the same building was spoken of and selected because of its nearness. The children dictated a note to ask the college librarian for permission to make the visit.

2. *The trip to the library.* First we planned our trip. The children wanted to know the answers to the following questions about the library :

- a. How big is it?
- b. Where do the people read?
- c. Where do they keep all the books?
- d. What does the librarian do for the people?
- e. Have they books for us to look at?

The kind of behavior necessary in visiting the library was discussed. In response to the question What must we be careful about if we go to the library? the children made the following suggestions :

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- a. We must keep with the teacher.
- b. We must speak softly so as not to disturb people who are reading.
- c. We must look around and find out what we want to know.
- d. We must thank the librarian for letting us come.

After the trip the children discussed what they had seen. The following is a summary of their reactions and discoveries :

- a. It was nice in the library. When may we go again ?
- b. There were many, many books.
- c. There were bookcases for the books.
- d. There were tables and chairs for the people.
- e. The librarian knows where all the books are ; she finds books for the people ; she had some cards and rubber stamps ; she put cards in the books ; she told some people they were talking too much.

3. *Motivation.* The children were asked, "Would it be a good thing to have a library in our kindergarten ? Why would you like it ?" They responded that they could go there to look at books, that they could play they were librarians, and that they could bring books from home for the library.

The teacher and the children then made plans for the library, centering their efforts around the following problems, each of which was discussed, the children offering ideas, which were commented upon by others. Ideas were tried out by actual experimentation. Only a summary is given of the procedure for each problem.

4. *Problems involved in the equipping of the library.* The first question asked was, "Where shall we have our library ?" A corner of the room was selected "because we don't need it for anything else" and "because it is light."

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On being asked, "What shall we need for our library?" the children readily suggested the necessities, such as tables, chairs, shelves, desks, and books. The shelves for the books were made by laying boards across blocks piled at the ends of the shelves. The tables were made of soap boxes turned on end, placed far enough apart, and topped with boards. The librarian's desk was made by nailing a board across the top of a box standing on end. The open side faced the librarian, and the children seemed greatly pleased that she could put her feet under the desk as she sat. A rubber stamp, a clay tray for cards, and a clay pencil-holder were supplied for the librarian.¹ The ordinary chairs in the kindergarten were put into the library, around the four tables made.

The problems were thought out by the group, and committees of children actually carried out the final work of making each article of equipment for the library.

The children collected all the books in the kindergarten to put into the library, and the teacher sent for some picture books. As children began to use the library, new problems arose.

5. *The care of books.* From the question How may we take good care of books? the children developed the following suggestions:

- a. We must have clean hands.
- b. We must know a good way to turn pages.
- c. We must carry a book without hurting its back.
- d. We must put a book away in a good place.

These habits were taught by demonstration on the part of both children and teacher. The children took great pride in showing how neatly they could turn pages, by very lightly touching the edge of the upper right-hand corner of the page with a clean, dry index finger.

¹See page 78.

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6. *Courtesy.* The following rules were given in answer to the question How may we be polite and thoughtful in our library?

- a. We must take turns at being the librarian.
- b. We must not be bossy when we are librarians.
- c. We must not grab books from one another.
- d. When sharing a book with other children, we must wait until they have looked at the picture before turning the page, and must hold the book so that the other children can see.
- e. We must speak softly, and should go to the library only to look at books, not to play with other things.

7. *Finding books.* Another trip to the college library followed the raising of the question How can we know where to find a book we want? The children were asked to notice how the librarian knew where to find books. They reported that there were cards with "reading" on them on each bookcase.

How could we mark a shelf that had all our animal books on it? A picture was suggested, and a child cut out a small colored picture of a dog and mounted it on a small card. The teacher suggested that the name *Animal Books* be printed on the card, for people who knew how to read to use, and for the children to learn to read if they could. Other cards were tacked to the shelves that had books about *Flowers and Plants*, *Things to Eat*, *How we take Rides*, and *How we Play*. This crude system helped the children to keep their books in order.

8. *Beautifying the library.* The second trip to the college library brought the report that there were vases of flowers and pretty pictures there. It was decided to make our library more beautiful. Pictures of Mother Goose subjects, of children reading, and of characters in stories were mounted and put up. A teacher made a very nice black

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Sambo of old stockings. Some children offered to make candlesticks¹ for the shelves. A sheet of colored paper was put on the librarian's desk. Some clay pots of tissue-paper flowers were made by other children.

9. *Making more books for the library.* It was decided that we might cut out pictures and make many books for our library. The children decided that they would like a book about aëroplanes, one about dogs, and one about wild animals. Magazines and also Sunday picture supplements were brought from home, and the kindergarten picture collection was used. The children first found all the pictures pertaining to the subjects chosen. A committee worked on each subject. Then all the pictures about dogs were looked at again with the idea of discarding duplicates and listing important pictures desirable but not yet found. Thus each subject was organized. The sequence of the pictures and their arrangement in the book, the making of the book itself, the decoration of the cover, the naming of the book, and the printing of the title (under the teacher's guidance), — all these were fruitful problems for the children to work out. On several later occasions the children made booklets for the library, recording some valuable experience. Butter-making was recorded in a series of pictures illustrating the whole process of making butter as seen by the children and as participated in by them.

10. *Resulting values.* The children have much enjoyed their library, and it has become a valuable part of the equipment of the school. They often go to the college library to get a wider acquaintance with books, and occasionally they are allowed to take books out for temporary use in their small library. Both parents and teachers report greater care in the handling of books.

¹ See page 79.

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PROJECT II. CANDLE-MAKING (FIRST GRADE)

Purpose. To make a gift for father for Christmas.

Aims. (1) To enrich the children's knowledge regarding the materials and processes involved in providing ourselves with lighting. (2) To foster an appreciation of the labor of the pioneer in making candles. (3) To feel satisfaction in a handmade article.

Teacher's preparation. The teacher consulted numerous books for both subject matter and pictures.¹ She sent for directions for candle-making and for price lists of materials,² and she sent to an oil company for advertising literature regarding the manufacture of candles. She searched the community for various pictures, heirlooms, and other materials to enrich the project.

Plans for working out the project. 1. *Introduction.* The children had planned to make candlesticks for their fathers for Christmas. Someone suggested that they might buy the candles at the ten-cent store, but the teacher suggested that they make the candles themselves. The children were surprised at this, some expressing the belief that they couldn't make candles at school. They showed great eagerness to try, and wished to know what candles were made of.

2. *Motivation.* The teacher brought out some candles for the children to examine. She asked the children to see if they could decide what the candles were made of. One child said "wax," another said "grease." One said he had chewed a piece of candle and it had tasted like white gum. Another said that his mother had melted something to put on her preserves to keep the air out, and he believed it was made of something like candles, for you could mold it when it was warm, and it felt and smelled

¹ See Appendix F, VII.

² See Appendix A.

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the same. The teacher then showed the children some paraffin, and told them that most of the candles today were made of paraffin, and that oil companies made paraffin from coal oil in a way the children could not understand. She told them that their candles could be made of paraffin.

3. *Experimenting.* After being asked, "How shall we go about making the candles?" some children suggested that the wax be warmed a little and "put around a piece of string." A child tried this idea, but the wax became hard too soon to wrap it well around the string. Another idea was to melt the wax and lay the string in it. When the wax grew cold the candle was taken up, but the children did not like it. It was not smooth, it was poorly shaped, and could not be put into a holder. Then a child said that if the wax were put into a bottle and the string put into the middle in some way, it would look more like a candle. The teacher said that long ago candles were made in molds. She brought out the candle mold she had borrowed. The children examined it. They decided what the corks were for and what the little tin strips at the top of the mold were for. They wanted to make candles that way. The boy who had suggested the bottle said the mold was better because you could get the candle out easily. The teacher said there was still another way to make candles; and as no one had further ideas, she took a piece of string and dipped it into some melted paraffin. The children quickly responded to this idea. The teacher said that each child could make a candle by dipping, and the remainder of the wax might be poured into the molds for candles to decorate the schoolroom.

4. *Candle-dipping.* The first problem was to make wicks. The children examined wicks and found that most of them were thicker than a single strand, hence they wished to twist two strands of common string together. The teacher

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showed them how to do this, by twisting two pieces, each of which was two and a half times the finished length. When tightly twisted, the ends were put together and the two twists "jumped" together into a cord. One child braided his wick.

How to hold the wicks was the next problem. Paper-clips were decided on, so that the wicks might be fastened to something while the wax was cooling. The children slipped the clips over the loops of their wicks, and a long, thin dowel was put across some clay jars to hold the candles.

The wax was shaved into a tall, thin coffee can, so that the least possible wax would be necessary to fill the can. The can was put into a pan of water and put on the stove to melt. The teacher asked the children if there was anything they knew of to use to color the candles. Some said water-color paint, but the teacher said that the paint would not mix well. She brought out a box of short ends of wax crayons and asked the children if this was something like wax. They agreed that it was, and the teacher said she had learned that wax crayons could color candles. The children chose the orange ends and added them to the melting paraffin.

It was found that after the first dipping of the wicks the candles needed to cool. It was also found that if the wax mixture was allowed to cool a very little, more of it adhered to the string, making fewer dippings necessary. Another discovery was that if, when dipping, the wick was left in the mixture too long, all the wax already on it would melt off. The children formed a procession and dipped their candles in turn, dipping until the candles were large enough. As the amount of mixture grew low in the can, it was a problem how to make a successful dipping. The teacher then poured hot water into the can, allowing the wax to float on top. The water did not

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affect the candles at all. Toward the end of the process the children shaped the wick ends of their candles prettily with the finger tips.

When all the candles were large enough, the children poured the remainder of the wax into the candle molds. They were interested to see how the wick had to be straightened, and how the candle had to be dipped in warm water to allow it to slip from the mold. It was decided to make some more mixture so that there could be enough candles molded to enable the children to give one to each of the other rooms. The children compared the molded candles with the dipped ones.

5. *Candlesticks.* The children were now ready to make candlesticks to hold the candles. Since no two candles were alike, each child needed to work out his own problem of shape. The teacher had several types of candlesticks to show them. They discussed the comparative merits of these, and then each child proceeded. The teacher allowed each child to compare the result of his efforts with those of other children, and the candles were tried in the sticks to be sure that they were going to look well. A low, rather massive type seems best for these young children. When the candlesticks had been painted with a soft blue enamel and the candles inserted, they were ready to be taken home.

6. *Supplementary ideas.* Feeling that the children had a sufficient background of experience, the teacher decided to add some enriching ideas to it. One day she told them about when their great grandmothers were little. She showed them pictures of pioneer homes lighted with candles. They compared the lighting of the homes with candles with the present methods of lighting, seeing advantages in both. They appreciated the convenience of the lighting of today and realized the difficulties of pioneer lighting.

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The children retold some of the Stevenson poems they knew, which mention the use of candles. They were "Winter-Time," "Shadow March," and "Bed in Summer." They tried to imagine the various situations spoken of in connection with candles.

The teacher brought a sample of beeswax and one of tallow, and allowed the children to feel and smell them and to learn where these materials come from. She told how they were used in the early days, and showed them a hand-dipped tallow candle and also a bayberry candle. She told about children who gather bayberries in other parts of the country, and showed them a branch with berries on it. She allowed the children to light the various candles and compare the flames and odors. She also brought some old-fashioned candlesticks and candle-snuffers for the children to examine.

On another day the children and the teacher talked about how we use candles on our holidays: candles in the windows and on the trees at Christmas time, candles on party tables and on birthday cakes, candle fun at Hallowe'en, were all described. The teacher also told the children about some of the candle customs of other countries. They decided that candles are very beautiful and that people like to use them for special days because of their beauty. A booklet was made to record the whole experience.

PROJECT III. RUBBER AND ITS USES (SECOND GRADE)

Purpose. To find out all we can about rubber.

Aims. (1) To stimulate a questioning attitude toward things in everyday use; (2) to encourage an appreciation of the value of rubber in solving the problems of life; (3) to foster appreciation of the many discoveries and experiments that have resulted in rubber products.

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Teacher's preparation. The teacher set herself these problems to work on before she began her reading:

1. What qualities of rubber make it so useful?
2. What experiences have the children had that bear on the subject?
3. What possibilities are there in this community for investigating rubber in any way?

She then read widely,¹ finding out much more about rubber than she could use with the children. She kept a list of books that had good pictures, another list of reading material for the children to use, and she kept a synopsis of the facts of inventions and discoveries and other interesting subject matter. She visited stores and shops, such as automobile supply companies, to find out where she could take children to see rubber being used for repair work. She collected bits of rubber gloves, tires, erasers and other parts of rubber products.

Plans for working out the project. 1. *Introduction.* The teacher asked the children whether they had ever thought very much about rubber, and whether they thought we needed rubber very badly. She allowed them to volunteer any ideas they had about the usefulness of rubber. They told about their balls, overshoes, erasers, balloons, and other possessions. This led to other ideas, and before long the children were thoroughly aroused and were making many contributions. The teacher wrote on the blackboard all the names of articles made of rubber, and a long list resulted.

2. *Uses of rubber.* The uses were brought out in the following way:

TEACHER. What makes rubber so useful? Let us look at the names on the board, and see whether there is some

¹ For lists of books for the teacher and for children's reading see Appendix E, F1.

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good reason for making these things of rubber. Wouldn't some other kind of material do just as well for balls?

CHILDREN. They would not bounce.

TEACHER. Wouldn't string do as well as rubber bands?

CHILDREN. It would not stretch.

TEACHER. Let us look over this list and mark all the things that are useful because they stretch. When a material stretches or changes shape as rubber does, what do we call it?

The children became familiar with the word *elastic*, and marked on the blackboard such names as *balls*, *garters*, *rubber bands*, and *balloons*, to prove that rubber is elastic.

The children said that balloons would stretch and you could fill them with air. The teacher asked if there were other things that could be filled with air. The children picked out rubber tires, air cushions, and rubber toys that are filled with air and make a noise when the air escapes. So it was decided that rubber is sometimes valuable both because it is elastic and because it will hold air.

The teacher asked for some other thing that rubber is very useful for. One child responded, "To keep out the rain," and one said that we call it waterproof. The children picked out the articles that are good for this reason, and named overshoes, raincoats, rubber aprons, and gloves.

When the hot-water bottle was named, the children thought it useful because it is both elastic and waterproof. They thought rubber tubes and garden or fire hose useful for the same reason.

The children thought that rubber heels are desirable because this substance keeps us from slipping. They thought that overshoes for the feet are good for that reason also, as well as for their waterproof character. Tennis shoes, typewriter feet, and rubber tips for the legs of chairs were mentioned.

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As the children did not name articles made of hard rubber, the teacher told them how rubber is hardened in the factory and made into combs, fountain pens, and phonograph records. They were able to mention other examples of this type of rubber product.

3. *Charts.* As a summary of the foregoing discussion, and to stimulate the children to further discovery, a series of charts was made. Each chart was headed with some such caption as "Rubber keeps us Dry" or "Rubber keeps us from Slipping." Then the children collected pictures from magazines and sales catalogues and cut out pictures of articles to be pasted under each caption. There was some discussion of pleasing arrangement before the actual pasting was done.

4. *Exhibits.* The children were asked to bring in any pieces of rubber they could find. All these articles were put on a table until a good-sized collection had been formed. After the children had had opportunity to examine the samples, the teacher asked such questions as "What is rubber made of?" and "Where does it come from?" The responses were varied, some thinking rubber was found in the ground, some thinking it was cooked and made, but of what no one knew. One child said his mother had a rubber tree, but he didn't know whether rubber came from that. On being asked, "How shall we find out where rubber comes from?" some children said we could ask people, and some said we could go to the library and read in books. It was decided that the group should go to the library and find out what they could about rubber.

5. *The library period.* The librarian and the teacher had found books with pictures which children could make use of. Some sets of stereographs about rubber-gathering for use in the stereoscopes were also found. When the children returned they had many theories and snatches of

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knowledge. Being unable to read much of what they had seen, and being dependent upon the pictures, they were full of questions. The teacher suggested that they should now do some reading to see if what they thought was right. They made a list of questions and of the different opinions held by the children. Then the teacher passed out some typewritten sheets upon which she had arranged the main facts of rubber discovery, rubber-gathering, and rubber manufacture in a series of reading lessons. When a unit of reading material had been read, the children were interested to exchange opinions and to verify or change first impressions.

6. *Excursions.* The children were asked, "What happens in your home town that has anything to do with rubber?" It was found that rubber goods were sold by many merchants. Several committees of children were appointed to visit merchants and find out what was sold. A trip was taken to a vulcanizing shop, and the activities there were observed.

7. *A program.* It was decided to have a program and invite the third grade. The charts served as centers for explanations made by several children concerning the uses of rubber.

The second feature of the program was the exhibiting of a peep show to represent a typical forest growth such as is found where rubber grows. This was made after the manner of peep shows as described in a previous chapter.¹ The show was lighted, and the guests looked into it.

Some of the children then told how rubber was first found, why it was called rubber, how rubber is gathered, and other main facts about its production.

The last part of the program consisted of activities which answered the question Why are we glad there is

¹ See page 195.

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rubber? A group of children came out from behind a screen, and said, "We are glad there is rubber because rubber gives us fun." Then this group played with balls, balloons, and rubber toys. Another group appeared, one child saying, "We are glad there is rubber because rubber helps to keep us safe." The children in this group showed rubber heels, fire hose, rubbers, and other things. A third group appeared, and one said, "We like rubber because it helps to keep us well." These children exhibited hot-water bottles, raincoats, and overshoes. These little scenes, showing the most important reasons for appreciating rubber, concluded the program.

PROJECT IV. A STUDY OF INDIAN LIFE (THIRD GRADE)¹

Teacher's aims. (1) To help children to appreciate the free outdoor life lived by the primitive Sioux and Dakota Indians; and (2) to encourage children to compare these Indians with the primitive peoples already studied with regard to food, shelter, and clothing.

Child's aim. To find out all I can about the Indians who used to live in this section of the country.

Teacher's preparation.² The teacher read widely on the subject of Indian life. She made note of references to readings that children could use, to pictures for them to see, and to suggestions useful in helping children to reproduce their ideas through handwork. She acquainted herself with the resources of the community, talking to old settlers and finding relics of frontier life.

Plans for working out the project. The children were in three groups and worked out their problems separately. Each group centered its endeavor upon some particular

¹ Worked out by Josie Manderfeld, Mankato State Teachers College.

² Books for the teacher and for the children are listed in Appendix F, III.

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topic of interest which they investigated and then reported upon to the entire class. The following large units were chosen: (1) the work of the Indian squaws and braves; (2) Indian costumes and decorations; and (3) how did the Indians amuse themselves?

1. *Reading.* Each group read two books on Indian life. Proudfoot's "Hiawatha Industrial Reader" served as a reference book for the entire class.

2. *Language.* Discussions took place during the language periods. Children asked questions at home and reported in class, telling of the pioneer experiences of grandfathers and grandmothers with the Indians of this section. Then they decided to write stories about what they had learned, so that the other groups might read them. They chose names for the stories, and each child wrote his own story. The group that took up the work of the Indian men and women wrote stories under the following titles: "How the Indian Hunts"; "How the Indian catches Fish"; "How the Squaws make Dishes"; "How to make a Canoe," etc.

3. *Literature.* Children read and were told Indian myths and legends. They studied parts of "Hiawatha," and became very much interested when they found that the scene of the story was laid in this section of the state. They learned Indian lullabies. The more advanced group became interested in the Eastman books¹ when they learned that Eastman and his fathers before him had lived in this vicinity.

4. *Manual activities.* The children collected Indian relics. They had Indian baskets, Indian pottery, and beadwork. They went to the library and found pictures of Indians in costume. They talked about Indian design, its meaning, the vivid colorings, and the Indian method of obtaining

¹ See Appendix F, III.

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natural dyes. They became interested in picture writing and worked out messages that might have been sent from one Indian chief to another. They made large free-hand crayon drawings to illustrate their stories. Each child made a clay bowl, planned his own Indian design, and painted it on his bowl.

5. *Music.* Phonograph records, such as the following help to give children additional ideas about Indian life: Columbia record A3162. It has on it "Tribal Prayer," "Mohawk Lullaby," "Happy Song," "Dance Song," and others. Victor record 19556B has "Sioux Flute Serenade." Records of Indian songs by Cadman, Lieurance, and others may also be used.

Instrumental music may be played for children, as follows: piano solos—"Dagger Dance" from "Natoma," by Victor Herbert (sheet music); "Wah wah-taysee," by Cadman (sheet music); "American Indian Melodies," harmonized for piano by Arthur Farwell (in book form, published by Schirmer).

6. *Planning for a program.* After the groups had come together and had shared their information, and the stories written had been given to the entire class, they decided to conclude their study by working out an Indian program and inviting parents and friends. They decided to dress as Indians, to have the program show a day in an Indian village, and to make a sand table showing Indians at work and play. They planned to combine their stories and drawings into a large book for the inspection of their friends. Individual children in one group chose to make miniature tepees, canoes, Indian cradles, and grass baskets. One boy prepared a rabbit skin. These things were added to the relics and formed a worth-while exhibit. The sand table showed an Indian village near a stream, a location typical of these parts. Clothespin dolls fished, ground grain, wove

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blankets, made clay bowls and grass baskets, and hunted deer. The scene was realistic, and the concrete representation did much in clarifying the children's ideas. Each child made his own costume for the play, first cutting and fitting a newspaper pattern. The children estimated the amount of material required and the cost per costume. After making his costume each child decorated his own with crayons; some made strings of beads, and most of the boys made war bonnets.

The program as worked out by the children is given below in full. It was a natural outgrowth of class work and showed in concrete form the children's conception of Indian life.

A SUGGESTION FOR AN INDIAN PROGRAM

SCENE I. MORNING

SCENE II. AFTERNOON

SCENE III. EVENING

SETTING. An Indian wigwam, made from Indian blankets. A tripod with a kettle hanging on it. Screens giving the idea of a forest round about, or background of branches.

SCENE I. MORNING

a. An Indian, rolled up in a blanket, lies outside the wigwam. All is quiet.

b. "In the Land of the Sky Blue Water" or some other Indian selection could be played behind the screen, on the phonograph.

c. At the end of the music the Indian man awakes and calls his squaw. He goes out into the forest with his bow and arrows (steps behind the screens).

d. The squaw comes out of the wigwam, carrying a papoose on her back. She stirs the fire.

e. Two Indian children also come from the wigwam and help to gather firewood.

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f. Squaws at work: (1) cleaning wigwam; (2) fixing fire; (3) weaving a rug; (4) making clay bowls; (5) weaving baskets; (6) scraping and preparing skins; (7) sewing skins into garments.

g. The father returns with food for breakfast, which the squaw cooks.

h. All sit down to eat out of a big wooden bowl.

i. At the close of the meal an Indian boy comes running to the camp and gives the father a message. It means, "An enemy has crossed our trail." (This should be written on something resembling birch bark and large enough for others to see the picture writing.)

j. The Indian warrior takes his bow and arrow, puts on some war paint, and runs after the boy, waving good-by to his squaw and children.

SCENE II. AFTERNOON

a. The squaw hangs the papoose up in a tree (on the screen) and sings to it the "Song of Nokomis."

Ewa-yea! my little owlet!
Who is this, that lights the wigwam?
With his great eyes lights the wigwam?
Ewa-yea! my little owlet!

b. During this time the Indian children play Indian games: (1) elephant race; (2) ball; (3) run the gantlet; (4) wrestling. Other children come running out of the forest to play with them.

c. The mother grinds meal and is busy about the camp.

d. Suddenly a messenger runs into the camp and hands the squaw a message. It means, "We have outwitted the enemy. Prepare a big feast."

e. She calls the children, and the boys are told to go and hunt meat for the feast.

Go, my son, into the forest,
Where the red deer herd together,
Kill for us a famous roebuck,
Kill for us a deer with antlers!

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f. Several of the boys take bows and arrows and set out into the forest.

g. The girls and the squaw gather wood to build a great fire. They bring more bowls from the wigwam.

h. The boys return with some animal (anything big and bulky looking which they can drag behind them).

SCENE III. EVENING

The screen can be turned about, showing dark on the other side, with stars and the moon on it.

a. Other squaws come to help to prepare the feast.

b. While the food is cooking, the squaws and the children sit about the wigwam and fire, waiting for the warriors to come. Their conversation may be something like this:¹

A CHILD. (*Pointing to the moon*) What is that I see, Nokomis?

NOKOMIS. Once a warrior, very angry,
Seized his grandmother, and threw her
Up into the sky at midnight;
Right against the moon he threw her;
'Tis her body that you see there.

(*Sound of an owl hooting.*)

A CHILD. What is that I hear, Nokomis?

NOKOMIS. That is but the owl and owlet,
Talking, scolding at each other.

A CHILD. Tell the story of the rainbow.

NOKOMIS. When you see the bow of colors
In the eastern sky, the rainbow,
'Tis the heaven of flowers you see there;
All the wild-flowers of the forest,
All the lilies of the prairie,
When on earth they fade and perish,
Blossom in that heaven above us.

c. Loud noises are heard, and many warriors come to the camp.

d. The squaws and children scatter and put food in bowls and give them to the warriors. The feast: Men seated in

¹ Adapted from "Hiawatha."

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circle, women serving, and children watching. Warriors tell the story of their victory.

e. After all have eaten, one Indian plays upon his drum, made of a piece of skin stretched over a hollowed piece of log. The others dance the Indian war dance about the fire.

f. Finally all leave except the family first seen.

g. The family sits about the fire and sings the "Firefly Song":

Wah-wah-taysee, little fire-fly,
Little, flitting, white-fire insect,
Little, dancing, white-fire creature,
Light me with your little candle,
Ere upon my bed I lay me,
Ere in sleep I close my eyelids!

They also sing "The Song of Nokomis."

h. The squaw and the children enter the wigwam. The warrior rolls up in his blanket outside the wigwam.

THE MAKING OF INDIAN INSTRUMENTS¹

A project in the making of musical instruments in connection with the regular music work of the school in a third grade resulted in the making of Indian drums. The children in the picture are seen with the drums they made.² The following compositions give an idea of how the children made their drums and sticks.

SIOUX INDIANS' DRUMS

BY ROBERT DYE, AGED EIGHT

First the Indians had to find a tree that was big enough to make the drum. When they found one that they thought would be round enough, they would chop it down. Then they would cut it into a little log long enough for a drum. They then hollowed it out.

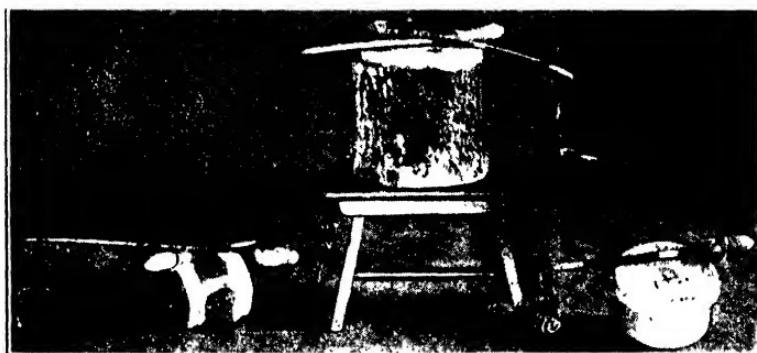
¹ See Appendix F, V.

² Worked out by Miss Adelaide Linnell, music supervisor, and Miss Amanda Johnson, third-grade supervisor, Mankato State Teachers College.

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THIRD-GRADE CHILDREN BEATING INDIAN DRUMS AND DANCING AN
INDIAN DANCE



INDIAN DRUMS AND STICKS

Made by third-grade children

Sometimes they have only one side to play on.

Next they put bear or reindeer skin on the top. Then they tie it around with sinew on both sides. Sometimes they make some out of bowls that they make from clay. We made our Indian drums out of logs and butter jars.

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ONE WAY THE INDIANS MADE THEIR TOM-TOMS AND TOM-TOM STICKS

BY MARIAN NICHOLS, AGED EIGHT

One way the Indians had of making their tom-toms was to make a jar and stretching skin over it and tying it down very tight. The Indians knew they needed a stick for their tom-tom so they found a stick, wound it with grass, then they painted the grass all colors. Then one end had to be bigger than the other to pound it with. So they wound it with skin, and they saw that the stripes did not look very nice so they put chamois skin and fringed that, that hung over the edge. Next they put feathers in with the fringe. Then took some grass and tyed feathers on to it, fastened that to the stick near the place where they hung on to it.

HOW THE SIOUX INDIANS MADE THEIR TOM-TOM STICKS

BY CAMILLA TRUMAN, AGED NINE

Of course you know that we could not do it just like the Indians do. So we took a stick about two feet long and wound it tight with cloth, then we took some chamois skin and wet it and stretched it over it, then cut some fringe. Then we took some raffia and wound it around the stick and last of all we made decorations and tied them on. Now there was another kind of a drumstick and so we made one like that. I am going to tell you about it. We took a piece of cloth and wound it tight with chamois skin.

PROJECT V. AN OUTLINE FOR A STUDY OF COTTON (THIRD GRADE)¹

Purpose. To make a study of the stages through which cotton passes from seed to finished product.

Aims. (1) To familiarize children with the main facts of cotton-raising and cotton manufacture, in order to make

¹ A composite of projects that have been actually worked out and of additional suggestions.

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them intelligent about this important commodity; (2) to encourage appreciation of the problems, inventions, and labor involved in providing us with cotton products; (3) to help children to discover the wide and varied uses of cotton; (4) to help children to get a sympathetic picture of Southern plantation life.

Teacher's preparation.¹ The teacher will first read very widely, preparing a much richer background than she can use with third-grade children. She may send for all possible exhibits and pictures, for cotton seeds for early planting, and for cotton bolls and whole plants for the children to work with.

Plans for working out the project. 1. *Introduction.* One way to begin this project is to arouse interest about the kinds of clothing we wear, and about the materials of which our clothing is made. The interest may be centered on cotton by asking where cotton comes from. It is likely that the children have had some knowledge of the cotton plant and of the South. The question Who would like to find out more about how cotton grows? would lead to a list of questions that showed what specific things the children would like to find out. This list could be put on the board and could be augmented by some questions the teacher might wish to add. The following are suggestions:

- a. What kind of plant, or tree, or bush does cotton grow on?
- b. What shape are the leaves?
- c. What color are the flowers?
- d. Does cotton grow in big fields?
- e. How many bolls grow on one plant?
- f. Which of our plants is cotton most like?
- g. How can we find out what we want to know?

¹ See Appendix F, I; also Appendix A.

EDUCATION THROUGH MANUAL ACTIVITIES

2. *Sources of information for children.* The material suggested in the bibliography¹ may be used both for the children's reading and for picture material. The exhibits² are very valuable if they are available. If teachers find it impossible to get much material for children to use, they may themselves organize into reading lessons for the children the facts obtained from their reading. These may be hectographed³ if typewriting is not feasible. From this the children may find answers to the questions they had asked about cotton.

3. *Planting and caring for cotton seed.* Children may write to some Southern city for cotton seeds, which may be planted in pots. Since it takes a long time for them to germinate, the teacher may have started some plants in advance of the study. Each child may make a record of the growth of the cotton plant, in the form of crayon drawings in a small folder or book. The seeds that were planted by the teacher could be taken up at intervals, and the children could draw pictures of these stages of growth. Since it is seldom possible to develop the mature plant, bolls, flowers, and the like in the schoolroom, good pictures may be used and the record of drawings completed. The children may tend and watch the seeds they have planted.

4. *Life on a cotton plantation.* In looking over the books and pictures the children will have seen the illustrations of negroes in the cotton fields. A general discussion may be had to present a humanitarian view of the negro, to correct some impressions of Northern children, such as the "negro is black because he never washes," and "negroes will hurt you." Characteristics of the negro, his dress, speech, and home may be talked about. The teacher

¹ See Appendix, F, I.

² See Appendix A.

³ See recipe for hectograph filler, p. 167.

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may give the children a point of view free from prejudice or race hatred and superiority.

The children may lay out a sand table or peep show to show life on a plantation and in a negro home. Pictures and discussion of the life of the plantation owner may also be given. This life may be compared somewhat to the life of the farm owner of the North.

The children may hear good stories about negro children and may play one of these stories as a puppet play. "Little Black Sambo" and "Epaminondas" are favorites.

Musical selections may be used to give children an appreciation of the contributions of the negro to music, as well as to the cotton industry. These phonograph records are suggested: Folk song of the South, such as "Carry me back to Old Virginny," sung by Alma Gluck. Negro spirit-uals, such as those sung by the Tuskegee singers. Some arrangements of the "Largo" from the "New World Symphony," by Dvořák. Piano record of "Juba Dance," composed by Nathaniel Dett, played by Percy Grainger.

The following piano selections may be useful: "Juba Dance," Nathaniel Dett; the "Largo," by Dvořák; "Deep River," piano arrangement; "Pickaninny Dance," by David Guion.

The children may learn to sing the song called "An American Negro Lullaby," in "Cradle Songs of Many Nations."¹ They may also sing some of the simple folk songs that everyone knows. Simple melodies may be sung through vocophones. They may make a negro pickaninny of old stockings, also an old mammy, and a little negro boy. This boy may have limp arms and legs and, by means of strings, may be made to dance to the jigs that are played.

The children may make crude banjos² of cigar boxes strung with wires on which they may thrum in accom-

¹ Clayton Summy.

² See page 171.

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paniment to some of the negro songs. Even though the strings do not have real pitch, there will be a body of thrumming and rhythm that is interesting. On percussion instruments such as children use they may accompany the piano, playing jigs and dances. One such selection is a song by Burleigh, called "My Merlindy Brown," in the "Family Music Book."¹ It may be used as a piano selection with an accompaniment of various combinations of the banjos with shuffling sounds made by means of sandpaper blocks.²

5. *The cultivation and harvesting of cotton.* With a somewhat colorful background of the life of the South the study of cotton may be resumed. A good question would be, How does the raising of cotton compare with that of corn and wheat? The children can first find out what they need to know by examining pictures, by reading, and by hearing the teacher tell them stories, and then the following problems may be taken up:

- a. What is the Southern climate like?
 - b. When and how is cotton planted? What care does it need while growing?
 - c. What pests attack the cotton plant? Make a study of the boll weevil and means of fighting it.
 - d. How is cotton picked? What equipment is used by the hand pickers? Compare machine picking and hand picking. How was the machine picker invented? How much faster does it work than the hand picker?
 - e. How is cotton taken to the mills? Show pictures of the river steamers, bales of cotton, and other scenes that apply.
6. If cotton bolls have been purchased, let the children each handle one and let them decide what would first have to be done if the cotton were to be made into cloth.

¹ Published by G. Schirmer.

² See page 170.

SOME PROJECTS OUTLINED

Cleaning the cotton of seeds should be experienced by the children. They should attempt to pick some seeds out by hand in order to appreciate the problem. They may then try to find a quicker way. The teacher may read aloud about a homemade cotton gin,¹ and the children may coöperate in the making of one of these.

The story of Eli Whitney should be told, and modern factory methods of cleaning cotton should be described to the children. The manufacture of cotton is such a technical matter that the best way to present it is not to make it too tedious or to tell too many details, but preferably to have some person who has visited a cotton mill tell the children the main facts. Pictures are valuable to show how complex the factory is. Exhibits² that may be purchased are invaluable for showing the stages in the manufacture of cotton.

7. The making of cotton into thread. The teacher may explain that one of the important steps in getting cotton ready to be made into cloth is that of making the cotton into thread. She may show the children how the cotton has long fibers in it and how these fibers can be made to run the same way. Each child may experiment to see if he can make a little piece of thread. Cards may be made by driving thin nails into small boards, or cotton cards may be purchased.³ The problem now is to make the fibers run parallel.

The next problem is twisting the cotton into a long, thin thread. A small weight may be tied to one end of a roll that a child has been making with the cards. Then allow the roll to hang with the weight at the bottom. Swing

¹ Frederick G. Bonser and Lois Coffey Mossman, *Industrial Arts for Elementary Schools*.

² See Appendix A.

³ These cards may be purchased from the Industrial Arts Coöperative Service, Teachers College, Columbia University.

EDUCATION THROUGH MANUAL ACTIVITIES

slightly so that the weight will draw out the thread. This is the distaff idea. Introduce the idea of the spinning-wheel; have one in the room if possible, and try to find someone who knows how to spin. There are many musical selections about the spinning-wheel which may be used here. These have a very real significance in themselves, besides giving more reality to the study of spinning. Tell the children also about the spinning-jenny, and briefly describe the factory methods of spinning.

8. *Weaving.* Children will have had some experience both with the making of looms and with actual weaving, and will therefore have some background for the fundamentals of the process. Some ways of the modern factory may be contrasted with old pioneer methods of weaving. Samples of hand-woven cotton cloth and machine-made cloth may be brought.

9. *Uses of cotton.* Children may conclude their study of cotton by visiting stores and making such other observations as will enable them to make a list of the many uses of cotton to mankind. A group may make a series of charts,¹ or each child may make a booklet. The pictures and samples of cotton products should be grouped according to some scheme; for example, under such headings as "Clothing Uses," "House-Furnishing Uses," "Health and Hospital Uses," and "Miscellaneous Uses."

¹ See page 190.

APPENDIXES

A. PURCHASING ADDRESSES

The Industrial Arts Coöperative Service of Teachers College, 519 West 121st Street, New York City, is a very valuable agency from which to procure needed materials and pictures for industrial projects. Information regarding membership, and price lists of materials sold by the service, may be obtained upon request. Examples of materials sold by this service are recipes and materials for candle-making, exhibits of cotton, silk, raw wool and flax, and pictures of primitive art.

Purchasing addresses of materials or articles mentioned in the text and not easily found are given as follows: A good quality of pottery clay may be purchased in barrels from the Redwing Stoneware Company, Redwing, Minnesota; especially serviceable if clay is needed in large quantities and if purchaser is near enough to this address so that transportation will not be too high. A wheel-cutter, mentioned in Chapter IV, is purchased of the Menomonie Tool Company, Menomonie, Wisconsin. Tillicum Tots, mentioned in Chapter V, 905 East Pine Street, Seattle, Washington. Dolls, vocophones, and many other fine toys, including the Hill Floor Blocks, are made by The Schoenhut Company of Philadelphia (send for their catalogue). The Stabuilt Blocks mentioned in Chapter V are made by The Embossing Company of Albany, New York. The Builder Boards are sold by the Northrup Collegiate School, Minneapolis, Minnesota.

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B. BOOKS THAT GIVE THE GENERAL EDUCATIONAL OUTLOOK OF TODAY

- BURKE, AGNES, and Other Teachers in the Horace Mann School. A Conduct Curriculum for Kindergarten and First Grade. Charles Scribner's Sons.
- GARRISON, CHARLOTTE. Permanent Play Materials. Charles Scribner's Sons.
- GESELL, A., and B. C. The Normal Child and Primary Education. Ginn and Company.
- HOSIC, J. F., and CHASE, S. E. Brief Guide to the Project Method. World Book Company.
- MOORE, ANNIE E. The Primary School. Houghton Mifflin Company.
- NORSWORTHY, NAOMI, and WHITLEY, MARY THEODORA. The Psychology of Childhood. The Macmillan Company.
- O'SHEA, M. V. (Editor). The Child; his Nature and his Needs. The Children's Foundation, Valparaiso, Indiana.
- PALMER, L. A. Play Life in the First Eight Years. Ginn and Company.
- PARKER, S. C., and TEMPLE, A. Unified Kindergarten and First-Grade Teaching. Ginn and Company.

C. BOOKS AND COURSES OF STUDY CONCERNING INDUSTRIAL ARTS

- BONSER, F. G., and MOSSMAN, L. C. Industrial Arts for Elementary Schools. The Macmillan Company.
- SARGENT, WALTER. Fine and Industrial Arts in Elementary Schools. Ginn and Company.
- Curriculum of the Horace Mann School, New York City.
- Francis W. Parker School Yearbooks and other publications. The Francis W. Parker School, Chicago.
- Minnesota Course of Study. State Department of Education, St. Paul, Minnesota.
- Publications of the Bureau of Educational Experiments, New York City.
- Publications of the Lincoln School, New York City.
- Seattle Course of Study for Industrial Arts in the Elementary School. Board of Education, Seattle, Washington.

APPENDIXES

D. BOOKS EMPHASIZING CHIEFLY THE FINE ARTS

McCARTY, STELLA AGNES, and a Committee of the International Kindergarten Union. Children's Drawings. The Williams & Wilkins Company. A report of an extensive survey of the interests and abilities shown in children's drawings.

MATHIAS, MARGARET E. The Beginnings of Art in the Public Schools. Charles Scribner's Sons. A valuable discussion of art education for young children by one who knows both art and children.

SNOW, BONNIE E., and FROELICH, H. B. Industrial Arts Textbooks. Prang Company. Paper-bound books, one for each grade, with design and suggestions for applied arts.

E. REFERENCES CONCERNING THE GENERAL SUBJECT MATTER OF INDUSTRIAL PROCESSES

The large museums of the country, such as the National Museum, Washington, D.C., the Metropolitan Museum of Art, New York City, and the American Museum of Natural History, New York City, publish pamphlets and pictures.

The United States Government publishes many pamphlets and reports. Write to the Superintendent of Documents, Government Printing Office, Washington, D.C., for lists.

The large manufacturing concerns of the country are constantly putting out pictures, pamphlets, and exhibits as advertising.

The following books may serve two purposes: they may serve as reference material for teachers and also as library reading for older children.

ALLEN, N. B. Geographical and Industrial Studies, a series of six volumes, including (1) United States (Revised Edition), (2) North America, and other volumes. Ginn and Company.

BONSER, F. G., and MOSSMAN, L. C. Industrial Arts for Elementary Schools. The Macmillan Company.

BROWNE, E. A. Peeps at Industries Series. The Macmillan Company.

BROWNE, E. A. When the World was Young. The Macmillan Company.

CARPENTER, F. G. Readers. Commerce and Industry Series, including (1) How the World is Fed, (2) How the World is Clothed, and others. American Book Company.

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- CHAMBERLAIN, J. F. The Home and World Series, including (1) How we are Clothed, (2) How we are Fed, and others. The Macmillan Company.
- CHASE, ANNIE, and CLOW, E. Stories of Industry, Vols. I and II. The Educational Publishing Company.
- WELLS, H. G. The Outline of History. The Macmillan Company.

F. REFERENCES ON SPECIFIC SUBJECTS

I. CLOTHING

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